

Winter 2022

Environmental Justice in the Elizabeth River Watershed: Exploring the Utility of Environmental Justice Screening Tools

Julianna M. Ramirez

Virginia Institute of Marine Science, William & Mary, jmramirez@wm.edu

Follow this and additional works at: <https://scholarworks.wm.edu/etd>



Part of the [Environmental Indicators and Impact Assessment Commons](#), [Environmental Studies Commons](#), [Social Justice Commons](#), and the [Water Resource Management Commons](#)

Recommended Citation

Ramirez, Julianna M., "Environmental Justice in the Elizabeth River Watershed: Exploring the Utility of Environmental Justice Screening Tools" (2022). *Dissertations, Theses, and Masters Projects*. William & Mary. Paper 1681950286.

doi.org/10.25773/8yby-8y11

This Capstone Project is brought to you for free and open access by the Theses, Dissertations, & Master Projects at W&M ScholarWorks. It has been accepted for inclusion in Dissertations, Theses, and Masters Projects by an authorized administrator of W&M ScholarWorks. For more information, please contact scholarworks@wm.edu.

Environmental Justice in the Elizabeth River Watershed: Exploring the Utility of Environmental Justice Screening Tools

Julianna M. Ramirez

A capstone project in partial fulfillment of the requirements for the degree of Master of Arts in
Marine Science at the Virginia Institute of Marine Science, William & Mary

December 2022

Advisory Team:

Dr. Robert Hale, Faculty Co-Advisor

Dr. Donna Bilkovic, Faculty Co-Advisor

Molly Blondell, Professional Mentor

Table of Contents

Abstract	3
Acknowledgements	4
I. Introduction	5
II. Historical & Theoretical Framing	8
A. Environmental Justice Theoretical Frameworks for Exposure to Hazards.....	8
Racism and Discrimination.....	8
Exploitation, Manipulation, Enticement, and Intimidation.....	9
Institutional Practices.....	10
Economics.....	13
Physical Characteristics.....	13
B. History of the Elizabeth River Watershed.....	14
Pre-1705.....	14
1705-1865.....	20
1866-1959.....	27
1960-Present.....	37
III. Goals for Addressing Environmental Injustice	42
A. Goal 1: Engaging Communities.....	42
B. Goal 2: Mapping Distributions.....	45
C. Goal 3: Measuring Equity	47
IV. Environmental Justice Screening Tool Indicators & Scoring Methodology	49
A. Environmental Hazard Indicators.....	49
B. Social Indicators.....	52
C. Institutional Indicators.....	54
D. Vulnerability Scoring Methodology.....	56
E. Environmental Amenity, Burden, and Practice Indicators.....	57
V. Conclusion	60
VI. References	63

Abstract

The Environmental Justice (EJ) movement has long highlighted the disproportionate exposure to environmental hazards experienced by Black, Indigenous, People of Color (BIPOC) and low-income communities across the country. Environmental practitioners have recently focused on utilizing EJ screening tools, which combine environmental and social data to visualize vulnerable communities, to begin to address environmental injustice rampant in BIPOC and low-income communities. This project explores EJ theoretical frameworks and the historical context of social oppression and environmental pollution in the Elizabeth River watershed (ERW) of Virginia to: 1) understand the social, political, and economic context behind environmental injustice; and 2) generate goals to address environmental injustice with a particular focus on utilizing EJ screening tools. This project highlights five EJ theoretical frameworks that can be used to explain disproportionate exposure to environmental hazards: 1) Racism and Discrimination; 2) Exploitation, Manipulation, Enticement, and Intimidation; 3) Institutional Practices; 4) Economics; and 5) Physical Characteristics and provides an overview of the history of the ERW to highlight the operation of these frameworks. Further, this project suggests three major goals to address environmental injustice: 1) empowering communities through equitable and just community engagement; 2) mapping distributions of environmental hazards, social factors, and institutional practices using EJ screening tools; and 3) ensuring that environmental amenities, burdens, and practices are equitably distributed and target vulnerable communities using EJ screening tools. This project serves as a framework for exploring the social, political, and economic contexts that give rise to environmental injustice and how EJ screening tools can be used to begin addressing them.

Acknowledgments

I want to acknowledge the Indigenous peoples who originally called the Elizabeth River watershed home - the Nansemond, Lumbee, and Chesepeian or Chesapeake peoples - and the historically enslaved peoples who were forcibly brought to these lands, and pay my respect to those who have lost their lives and to those who continue to fight another day. May your stories never be forgotten, your sacrifices not be taken in vain, and your lives forever honored. I also want to acknowledge and thank my mentors - Dr. Robert Hale, Dr. Donna Bilkovic, and Molly Blondell - for supporting me through this journey and sharing your ever-insightful perspectives. Thank you to Dr. Molly Mitchell and Dr. Linda Schaffner for allowing me to take this nontraditional path and encouraging me to continue this journey, even when the path seemed obstructed. I want to thank Dr. Dorceta Taylor and the Environmental Fellows Program at the Yale School of the Environment for preparing me to be an environmental justice advocate. Lastly, I want to thank Lynn Godfrey, Dr. Michael Unger, Dr. Benjamin Cuker, and Joe Rieger for graciously offering your invaluable experiences, perspectives, and expertise.

I. Introduction

Framed initially as environmental racism, the disproportionate exposure to environmental injustice experienced by Black, Indigenous, and People of Color (BIPOC) can be traced back centuries to indigenous resistance to colonization and the enslavement of African peoples (Gilio-Whitaker, 2019; Merchant, 2003). The exploitation of land is inherently tied to the exploitation of people, which has generated an environmental history distinct from that of the Eurocentric viewpoint (Merchant, 2003). Thus, the acts of colonization and slavery in North America that date back to the 16th century shaped the injustice that gave rise to the modern EJ movement.

The modern EJ movement was first highlighted in 1968 in Memphis, TN, during a sanitation strike that was investigated by Dr. Martin Luther King Jr. (Bullard, 1994). The strike marked the first-time BIPOC were mobilized to draw national attention to the inordinate exposure to environmental hazards in their neighborhoods and workplaces. However, legal action against environmental discrimination was not brought until the 1979 lawsuit, *Bean vs. Southwestern Waste Management, Inc.* (Bullard, 1994). The lawsuit was filed by Black homeowners in Houston, TX, challenging the construction of a landfill near a predominantly Black public school. In 1982, national attention was drawn by the events in Warren County, NC, after an uprising by Black residents against the construction of a landfill for dumping dirt containing polychlorinated biphenyls (PCBs), which are industrial compounds where some are highly carcinogenic (Bullard, 2004).

The protests in response to the dumping of PCB-laced dirt launched the modern EJ movement into the national arena. Warren County protesters brought environmental racism into the limelight and empowered the Black community to act. The events triggered investigations

into the disproportionate exposure to toxic waste experienced by BIPOC communities conducted by the General Accounting Office of the Environmental Protection Agency (EPA) in 1983 and the United Church of Christ in 1987 (Bullard, 1994). Reports, such as the Toxic Waste and Race in the United States report by the United Church of Christ, helped illustrate the connection between race and exposure to waste and provided empirical evidence for environmental racism (Commission for Racial Justice, 1987). A pivotal moment for the modern EJ movement was in 1991 at the First National People of Color Environmental Leadership Summit, which demonstrated the possibility of building a multiracial movement, broadened the focus of EJ beyond toxic waste, and developed guiding principles for the movement (Bullard, 2004).

The EJ movement goes beyond that of the national environmental movement by characterizing the unequal distribution of environmental burdens based on race while empowering those faced with the burdens to advocate for change. Additionally, it highlights how colonialism and racism have enabled the disproportionate environmental injustice experienced by BIPOC communities and has shaped the institutions of the United States (U.S.) to not only exploit land, but also Black, Indigenous, People of Color (Bullard, 1993). Such exploitation has allowed certain White people to receive benefits, leaving many Black, Indigenous, and People of Color to bear the costs of environmental burdens, laying the foundation for environmental racism, and necessitating the launch of the modern EJ movement. The movement is based on an ecocentric view that is grounded in justice and the right to clean air, water, and food, that expects fair treatment and calls for compensation when violated, that is autonomous, that recognizes the connections between politics, economics, militarization, and environmental injustice, that demands inclusion during the decision-making process, and that is inherently tied to the social movement (Taylor, 2000).

Recent research in the EJ field has focused on deploying and using screening tools to understand environmental injustice across the country. EJ screening tools combine social and environmental data to visualize communities with the greatest vulnerability to environmental injustice (Blondell et al., 2020). Communities, such as those within the Elizabeth River watershed (ERW, Fig. 1), that are exposed to inordinate environmental hazards are insightful case studies for deploying and utilizing EJ screening tools. This project will explore EJ theoretical frameworks and the historical context of social oppression and environmental pollution in the ERW to: 1) understand the social, political, and economic context behind environmental injustice; and 2) generate goals to address environmental injustice with a particular focus on utilizing EJ screening tools.

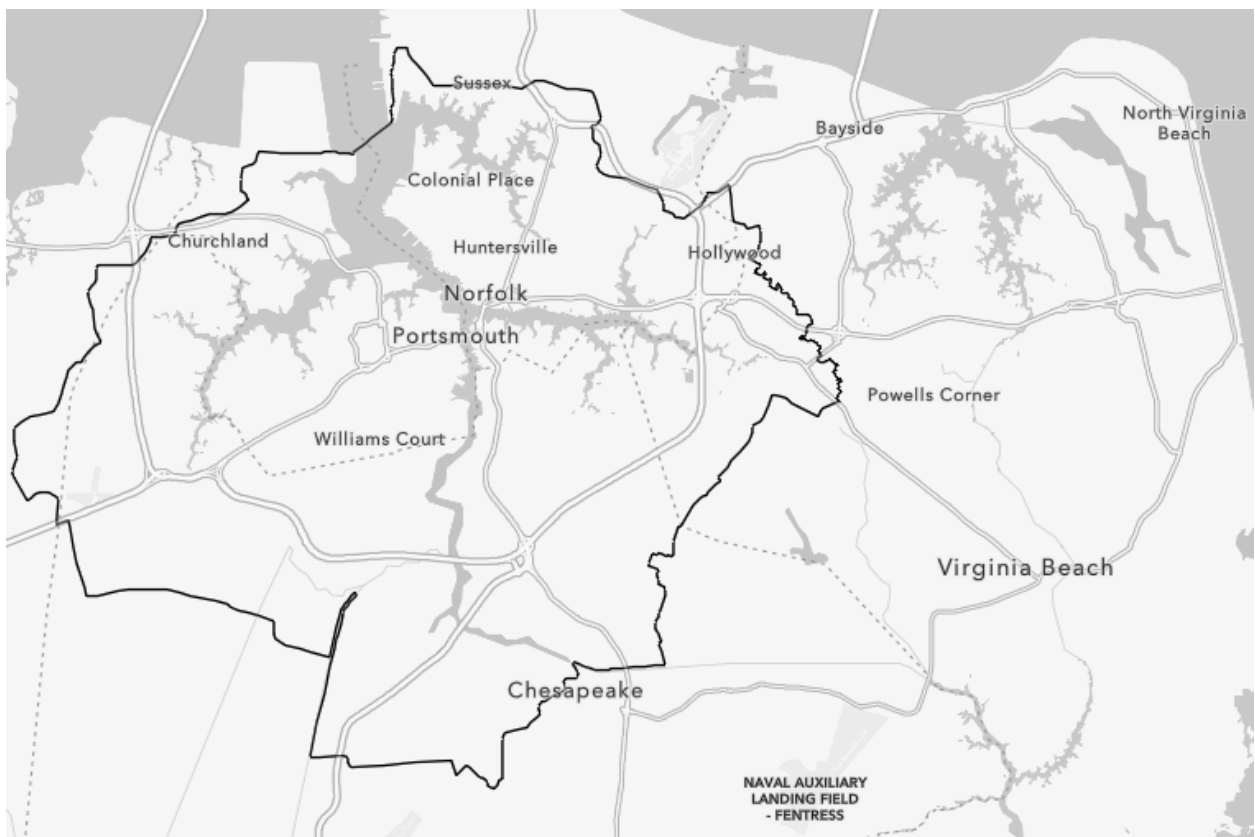


Figure 1. Map of the Elizabeth River watershed with cities of Norfolk (Est. 1680), Portsmouth (Est. 1752), Virginia Beach (Est. 1952), and Chesapeake (Est. 1963) noted.

II. Historical & Theoretical Framing

Major claims of the EJ movement are that hazardous sites are concentrated in BIPOC and low-income communities and that those communities are disproportionately exposed to environmental hazards (Taylor, 2014). In her book, *Toxic Communities*, Dr. Dorceta Taylor describes various EJ theoretical frameworks used to explain exposure to environmental hazards. Much of the contemporary EJ research has failed to apply and test explicit theoretical frames to analyze environmental injustice and thus fail to understand the forces in place ensuring disproportionate exposure by BIPOC and low-income communities (Taylor, 2014). This section aims to analyze the history of social oppression and environmental pollution across the ERW and apply EJ theoretical frames to understand the forces behind environmental injustice. It is not a comprehensive analysis of the history of the ERW or EJ theoretical frameworks but rather an overview to assist with the historical and theoretical framing of oppression and pollution across the ERW.

A. Environmental Justice Theoretical Frameworks for Exposure to Hazards

Racism and Discrimination

The Racism and Discrimination Framework is based on the disproportionate siting and discrimination theory that argues exposure to environmental hazards is based on racist and discriminatory behavior (Taylor, 2014). This is one of the earliest and most used frameworks to explain disproportionate exposure, and the most controversial. It arose after early EJ studies found that race and income were significant factors in explaining the distribution of hazards, with race being the strongest predictor (Mohai & Bryant, 1991; Taylor, 2014).

An underlying assumption of this framework is that communities were selected before the onset of hazards, meaning they were consciously and intentionally targeted to bear the hazards (Taylor, 2014). While unintentional racist and discriminatory behavior (i.e., institutionalized racism and discrimination) can still be the driver behind the distribution of hazards (Gurtoo & Antony, 2007; Taylor, 2014), evidence for intentional discrimination is critical for proving disproportionate exposure based on racism and discrimination in a legal context (Godsil, 1991). This is based on the legal, regulatory, and administrative theory, which highlights criteria that must be met for EJ cases pleading violations of the 14th Amendment (Taylor, 2014). Specifically:

- 1) Governmental action must be involved for the equal protection clause to be violated;
- 2) the clause applies to local, state, and federal government actions; 3) private acts of discrimination are not covered under the equal protection clause, unless they are somehow aided, mandated, or abetted by state law; 4) proof of governmental intent to discriminate is required to show that equal protection is denied; and 5) only insidious or unjustifiable discrimination is prohibited. Mere evidence or proof that there is disparate or disproportionate impact on one or more groups of people in an EJ case is not sufficient to prove intent to discriminate (Taylor, 2014).

Exploitation, Manipulation, Enticement, and Intimidation

The Exploitation, Manipulation, Enticement, and Intimidation Framework is based on the internal colonialism and center-periphery theory, the manipulation, enticement, and environmental blackmail theory, and parts of the market dynamics and economic rationality theory, and racially restrictive covenants theory which argue that exposure to environmental hazards is an implication of exploitative, manipulative, enticing, and intimidating behavior

(Blauner 1969; Taylor 2014). The internal colonialism and center-periphery theory argues that communities are treated as internal colonies in regard to the operation of hazardous facilities and the extraction and processing of hazardous materials not only because of their rich natural resources but because of the ease of economic exploitation due to high unemployment and low wages (Taylor, 2014). Heavy militarism and political coercion are often used to ensure exploitation and can in part explain the experiences of Indigenous and historically enslaved peoples across the U.S. (Taylor, 2014).

Further, the manipulation, enticement, and environmental blackmail theory highlights how facilities aim to sway communities to accept hazards by promising jobs, increased tax revenues, direct payments, etc. (Taylor, 2014). It recognizes the challenges in properly negotiating compensation when communities do not “know what can be negotiated for and with whom to negotiate” (Taylor, 2014). The market dynamics and economic rationality theory discusses how facilities seek out and exploit the “path of least resistance”, which typically includes having a low income, having high school or less education, lacking involvement in social activism, lacking community organizing and mobility, and willingness to accept promises of economic benefits (Taylor, 2014). Lastly, the racially restrictive covenants theory discusses how harassment and intimidation tactics are used to coerce BIPOC and low-income residents to allow the siting of hazardous facilities or force residents to move to areas where hazardous facilities are sited (Taylor, 2014).

Institutional Practices

The Institutional Practices Framework is based on the residential segregation, exclusionary zoning, racially restrictive covenants, and the racializing blight theories that argue exposure to environmental hazards is due to institutionalized factors such as segregated

residential patterns or political practices (Taylor, 2014). This framework highlights the two major models used to explain the existence and persistence of segregation: 1) segregation being a natural process arising from competitive behavior for housing between different racial and ethnic groups or 2) segregation being the implication of White people dominating and controlling the housing market (Taylor, 2014). The zoning and residential framework largely supports the second model and further argues that this process is facilitated by realtors, financial institutions, and local governments who institute segregation by utilizing racially restrictive, exclusionary, and expulsive zoning laws, utilizing restrictive covenants, declaring communities as blighted, and redlining (Taylor, 2014). Racially restrictive zoning laws promote and enforce segregation and were enacted to:

- 1) designate separate city blocks on which White people lived and ones on which Black people and other people of color lived;
- 2) withhold building permits from people trying to build in areas where the majority of the residents were of a different racial group than the applicant;
- 3) make it illegal for people to live on a street where the majority of the residents were of a racial group they were forbidden by law to marry;
- 4) create buffer strips to separate Black people and White people;
- 5) create agreements between White people and Black people about racial districts each would inhabit;
- 6) invoke executive military segregation orders; and
- 7) designate BIPOC neighborhoods as commercial, industrial, or manufacturing districts (Taylor, 2014).

While many racially restrictive zoning laws have disappeared, exclusionary ones remain and promote and maintain segregation. These laws typically control the types of residential development permitted in a given area which excludes certain groups (i.e., moratoria on the construction of new housing, bans or limits on construction of particular dwellings such as

mobile homes, etc.; Taylor, 2014). Further, expulsive zoning describes the process by which BIPOC and low-income neighborhoods are rezoned to allow industrial or commercial practices, which results in the expulsion of residents (Rabin, 1990). Outside of zoning laws, restrictive covenants are used by developers and individual property owners to control land use and occupancy, segregate communities, and stall the placement of hazards on particular lands (Taylor, 2014). These private agreements are safe from judicial rulings against segregation and have allowed owners to “create and preserve racially homogenous neighborhoods” (Taylor, 2014).

Additionally, eminent domain, the practice by which the government can seize private property, is a longstanding tool to develop projects aimed at urban renewal, slum clearance, and the elimination of blight (Taylor, 2014). Numerous BIPOC and low-income communities have been labeled as “blighted”, “slums”, or “ghettos”, regardless of the quality of housing, and thus subjected to eminent domain (Taylor, 2014). Further, redlining was a practice instituted by the Home Owners’ Loan Corporation (HOLC), which assessed neighborhoods’ likelihood of obtaining home financing and “resulted in a systematic, institutionalized devaluation of Black, racially mixed, and old inner-city neighborhoods across the country” (Taylor, 2014). Racially restrictive, exclusionary, and expulsive zoning laws, restrictive covenants, declaring communities as blighted, and redlining practices are often couched in language that deflects recognition of negative impacts on BIPOC and low-income communities and instead highlights the “protection”, “preservation”, “enhancement”, etc. of neighborhoods (Taylor, 2014). The Institutional Practices Framework goes beyond segregated residential patterns to include political practices such as gerrymandering or regulatory policies, which influence the political power of communities and ultimate exposure to hazards.

Economics

The Economics Framework is based on the market dynamics and economic rationality theory that argues exposure to environmental hazards is based on the economic-based behavior of facilities and community residents (Taylor, 2014). It can counteract the Racism and Discrimination Framework by arguing that facilities do not select BIPOC and low-income communities due to racist or discriminatory behavior but because those communities are the cheapest sites to host hazards. Therefore, facilities act in an economically rational manner and seek only to control costs or optimize returns (Taylor, 2014).

Further, this framework highlights the economic behavior of community residents and investigates residential sorting patterns such as White flight. The framework explores how people select neighborhoods based on amenities and burdens, which may induce neighborhood racial changes (Taylor, 2014). White flight describes how White people move out of racially mixed neighborhoods due to racial, class, and/or environmental compositions (Taylor, 2014). Such residential sorting patterns have implications for property values and residents' abilities to afford certain neighborhoods. This creates a trade-off where residents are "either unwilling to pay for safer, more expensive housing or are trading off living with higher risks for more affordable housing" (Taylor, 2014). The underlying assumption of this framework is that BIPOC and low-income communities are not being discriminated against in market dynamics or by the exposure to hazards, but are choosing communities with burdens based on a trade-off for affordability (Taylor, 2014).

Physical Characteristics

The Physical Characteristics Framework is based on the unique physical characteristics theory that argues exposure to environmental hazards is due to facilities selecting sites based on geography, geological formations, and geophysical conditions (Taylor, 2014). It is another framework that can counteract the Racism and Discrimination Framework and is often cited by government agencies, politicians, and hazardous waste facilities. The Physical Characteristics Framework was used in the case of Warren County, NC, involving the dumping of PCB-laced dirt (Taylor, 2014). The EPA had clear specifications of the type of soil formation and the depth of the water table that would be required to safely dispose of the contaminated dirt (Taylor, 2014). Thus, one could argue that the site chosen for disposal may have been selected based on the geological criteria (though evidence suggests that the geological criteria were not met in Warren County and that the EPA waived its requirements; Taylor, 2014).

B. History of the Elizabeth River Watershed

Pre-1705

Based on the current archaeological record of the ERW, Indigenous peoples inhabited the area as far back as 10,000 years before present (BP), with settlements occurring around 3,000 BP (Yarsinske, 2007). The earliest known Indigenous villages in the ERW were Skicoak (present-day Norfolk), Apasus, and Chesepiooc (both in present-day Virginia Beach and Chesapeake), which were inhabited by the Cheseopian or Chesapeake people (Yarsinske, 2007). The Cheseopians were Algonquian-speaking people. However, they did not belong to the Powhatan Confederacy, which was a band of at least 30 Algonquian-speaking tribes later dominating much of the Chesapeake Bay region in the 16th century (Mooney, 1907). European contact with the Cheseopians was documented in 1584, during Sir Walter Raleigh's expedition from Cape Henry (present-day Virginia Beach) to Cape Lookout (present-day North Carolina;

Yarsinske, 2007). However, the Chesepians were thought to have been incorporated (with many likely killed) into the Powhatan Confederacy by the establishment of Jamestown in 1607 (Mooney, 1907; Yarsinske, 2007).

The earliest interactions with Europeans by Algonquian-speaking peoples were with the Spanish, perhaps as early as 1498, though certainly by 1524 (Mooney, 1907). A notable story of such interactions is that of Paquiquino and the attempt of the Spanish to convert Indigenous people to Christianity (a practice that did not end with the Spanish). Paquiquino was an Algonquian-speaking young man likely kidnaped by the Spanish in 1561 (Parramore et al., 2000). He was transported to Spain, taught Spanish, baptized to become Don Lu s de Velasco, and joined the Jesuits' expedition to return to Virginia to establish Ajac n, a Jesuit mission on the Virginia Peninsula in 1570 (Musselwhite et al., 2019). However, circa 1571, Paquiquino turned on the Jesuits and led an attack on the Ajac n mission which resulted in the deaths of nearly every member (Parramore et al., 2000). This story highlights how Indigenous people of the area fought for their freedom from European colonists long before 1607 and provides insights into their perceptions of Europeans by the time the English arrived and established Jamestown.

The first two years following the arrival of Englishmen were considered a "probationary" period full of intercultural tensions (Fausz, 1990). Not unlike the Spanish, the English too viewed Indigenous people as "savages" and "heathens" who ought to abandon their way of life and seek salvation by conversion to Christianity (Fausz, 1990). Wahunsonacock (leader of the Powhatan Confederacy) was wary of the English, however, he decided to help them with food to prevent them from starving in those first few years (Fausz, 1990). Tensions rose by 1609 leading to the first Anglo-Powhatan war, which lasted until 1614 and claimed 500-600 lives on both sides (Fausz, 1990). It was the Powhatans' attempt to remain in control of

their territory and the English's attempt to assert dominance over the "unholy savages" (Fausz, 1990). Tensions cooled somewhat following the marriage of Amonute (known as Matoaka or Pocahontas, daughter of Wahunsonacock) and John Rolfe (Virginian colonist), where Amonute converted to Christianity and was baptized as Rebecca Rolfe (Kramer, 2016). Thus, Amonute symbolized the "civilized savage" to the English and served as hope for Indigenous assimilation to the holy English culture (Fausz, 1990). However, following the death of Amonute in 1617, Anglo-Powhatan interactions worsened, leading to the 1622 uprising.

Opechancanough (Chief of the Powhatan Confederacy following the death of Wahunsonacock in 1618) led a surprise attack on the English to halt further English expansion into Powhatan territory. The attack resulted in the death of 300-400 Englishman and started a 10-year war that shifted the English interactions with Indigenous people from dominance and conversion to expulsion and extermination (Kramer, 2016). An agreement was reached to end the war in 1632, largely due to food shortages, however, by then the English population exceeded that of the Powhatans (Kramer, 2016). Continued expansion into Powhatan territory by the English in 1644 started a third war, which lasted two years, and resulted in the death of Opechancanough, the end of the Powhatan Confederacy, and hundreds of Indigenous people being forcibly enslaved (Feeley, 2000). In 1646, a treaty was signed between the English and Necotowance (chief of the Pamunkey tribe) which defined territorial boundaries, restricted movement and trade between territories, and aimed to limit interactions between the English and Indigenous people (Feeley, 2000).

However, the decades following the signing of the treaty were full of conflict over fundamental issues of trade, land rights, and enslavement and eradication of Indigenous people. In 1649, a modification to the 1646-treaty allowed the killing of Indigenous people who

trespassed into colonial territory (Shefveland, 2016). By the 1650s, Indigenous children were regularly placed in English education systems to enhance assimilation to English culture (Ablavsky, 2010). In fact, the College of William & Mary operated an “Indian school” to assist with religious conversion and secular education from 1691 to 1777 (Stuart, 1984). Over the next decade, further acts were passed that restricted Indigenous freedoms such as requiring badges for travel between territories and specific regulations for trading (Shefveland, 2016). In the 1660s and 1670s, laws were passed that allowed “refractory Indians” to be “reduced to obedience” and permitted the selling of Indigenous children (Shefveland, 2016). Interactions amongst the colonists and Indigenous people again became volatile in 1667 during Bacon’s Rebellion, where Nathaniel Bacon and some 500 colonists demanded the General Assembly remove Indigenous people, and ultimately resulted in the indiscriminate murder and enslavement of Indigenous people (Shefveland, 2016). By 1682, it was common practice that Indigenous people captured as prisoners were enslaved (Shefveland, 2016), and over the next two decades, laws were passed that solidified this practice.

The years following the arrival of the English not only led to the enslavement of Indigenous people, but also the rise of the African slave trade in Virginia. In 1610, 134 survivors from the *Sea Venture* wreck arrived in Jamestown to find only 90 colonists left, as many had died from famine and disease (Fausz, 1990). Among the arrivals was John Rolfe, who is not only known for his “peace-making” marriage to Amonute, but also for giving rise to commercial cultivation of tobacco around 1612 (Routh et al., 1998). Following the early cultivation of tobacco in Virginia, demand in England for Virginian-grown tobacco grew, as did the need for laborers. Indentured servitude was common in English culture and existed in early Jamestown (Billings, 1991). Upon the establishment of the Virginia General Assembly in 1619, laws

defining contractual obligations began to surface and were continually modified throughout the century (Billings, 1991).

In 1619, the *White Lion* docked in present-day Hampton, bringing 20-30 African men and women, seized by the Portuguese from present-day Angola, to be exchanged for provisions (Musselwhite et al., 2019). There has been much debate over the centuries as to whether the African people were brought to Virginia to be sold as slaves or indentured servants. George Yeardley, a member of the *Sea Venture* crew and later Governor of Virginia, acquired some of the African people to work at his Flowerdew Hundred tobacco plantation (Musselwhite et al., 2019). Many were still laboring there upon Yeardley's death in 1627, suggesting they were considered slaves, as servants would have likely already been released (Musselwhite et al., 2019). His son, Argoll Yeardley, still owned two of the African people (Andolo and Maria) in 1637 and records showed he later sold their daughters in 1653 (Musselwhite et al., 2019), further providing evidence of them being considered slaves.

In 1620, population records showed 32 African people and by 1650 the population grew to 300 (Musselwhite et al., 2019). Starting in the 1640s, and occurring throughout the century, specific amendments to Virginia law regarding servitude surfaced. Understanding such changes to Virginia law (and the evolution of the language used) is particularly important for discerning the English view on African and Black people in those early years and the political and social climate that led to slavery being introduced into Virginia law. The stories of Victor, James Gregory, and John Punch are particularly important for highlighting this evolution. In 1640, three indentured servants attempted to escape colonial Virginia for Maryland - Victor, a Dutchman, James Gregory, of Scotland, and John Punch, a Black man (Hazard, 2020). Their escape was unsuccessful, and each faced the court. The two servants from European descent received four

additional years of servitude, whereas John Punch was sentenced to a lifetime of servitude (Hazard, 2020). This again emphasized the English view of African and Black people as that of slaves (not servants) long before it was enacted into Virginia law.

Another important English viewpoint around this time was that on sex and the rise of the “mulatto.” As Christians, the English had many prejudices against sexual intercourse outside of marriage and viewed adultery and fornication as moral offenses (and briefly as capital crimes following a law passed in 1650, though it was eventually overturned; Billings, 1991). Children born from fornication were routinely baptized and held in servitude (not to exceed past their 31st birthdays), though such practices were blurred for those born from parents where at least one was a Black person (Billings, 1991). Take the story of Elizabeth Key, the daughter of an unnamed African woman and Thomas Key (Billings, 1991). Upon her father’s death in 1636, she was sold into servitude and became the property of John Mottrom I (Billings, 1991). Upon Mottrom’s death in 1655, Key sued the Mottrom estate for her freedom on the following grounds: 1) her father was English; 2) she had been baptized and was a Christian; and 3) she had been sold for a term of years that had long since passed (Billings, 1991). Through a series of appeals, she was finally freed. However, her lawsuit (and ones like it) set the political climate for the passing of a 1662 law that stated that the freedom of children born outside of marriage would be dependent on the status of their mother (Billings, 1991). In other words, children born to African women who were indentured servants for life, would also become indentured servants for life.

Many other critical laws were passed during this period that amplified the English view on Black people as that of slaves. Namely, the laws passed in 1642 and 1643 that required owners to regard African men and women as “tithable” and the 1671 law that introduced the idea of Black people as “chattels” (Billings, 1991). Further, a 1667 law declared that baptism and

conversion to Christianity ought not to alter servitude status (Billings, 1991). This halted the practice that began surfacing in the 1640s, where Black and Indigenous people were freed from a lifetime of servitude on the premise that they were baptized Christians (Hazard, 2020). By 1672, the Royal African Company monopolized the slave trade which resulted in thousands of African men and women being removed from their homelands. The rise in African people forcibly brought to Virginia, the domination of Indigenous people, and the laws gradually passed throughout the 17th century shaped the view of Black and Indigenous people as that of property and established slavery into Virginia law.

1705-1865

“An act concerning Servants and Slaves” was passed in October of 1705, which stated that “all servants brought into this country without indenture, if the said servants be Christians, and of Christian parentage ... shall be a servant no longer than the accusatory five years” (Hening, 1823). However, “all servants imported and brought into this country, by sea or land, who were not Christians in their native country ... shall be accounted and be slaves, and such be here brought and sold notwithstanding a conversion to Christianity afterward” (Hening, 1823). The act further outlined the various rights for servants, lack thereof for enslaved people (defined as that of property), rights for masters to punish enslaved people without the interference from the state, punishments for fornicating with “negro” or “mulatto” persons (i.e., prison time, a fine of 10,000 pounds of tobacco), and more. (Hening, 1823). The years following the implementation of the Virginia Slave Codes of 1705 consisted of a gradual elimination of the rights of Black and Indigenous people, and rigorous control over their behavior.

In the early years following 1705, manumissions were intermittently granted, though many colonists began to fear a revolt by those freed. In 1712, a plantation owner in Norfolk

County freed 16 men and women, and provided them with tracts of land; however, councilors began to demand that the General Assembly ban such manumissions to prevent “potential danger” (Hast, 1969). In 1723, a law was passed that forbade the freeing of any enslaved person except for certain cases of “meritorious service” as judged by the state, thus ensuring little change to the status of Black people across Virginia (Hast, 1969). Daily life was severely restricted by the hand of slave-owners and the law, who were largely concerned with controlling runaways and insurrection. Another law passed in 1723 effectively diminished community among enslaved people by establishing that any group of five or more individuals who may be prone to conspire to rebel, make insurrection, or murder any person will be sentenced to death (Schwartz, 1998). Further, a law passed in 1723 denied the right to bear arms for any “negro, mulatto, or Indian whatsoever” (Bilal, 2000) and prevented Black people from testifying against any White person in courts (Schwartz, 1998). One of the only rights granted during this time period, was that of the right to clergy, which was passed in 1731 and granted enslaved people access to clergy in specific cases (Schwartz, 1998).

By 1748, further modifications to the Virginia Slave Codes of 1705 assisted with the “governing of slaves, free negroes, mulattoes, and Indians” (Schwartz, 1998). These modifications exerted tighter control by declaring enslaved people to be personal property, outlining subsidy benefits available to White Christians to incentivize slave-owning, defining punishments for runaway slaves and those who committed capital crimes (particularly emphasizing poisonings which led to a law banning certain peoples from administering medicines whatsoever), etc. (Hast, 1969). These laws (and subsequent laws passed over the next two decades) further strengthened institutional practices of slavery and sentenced more Black people to death for committing crimes than ever before (Schwartz, 1998). A rapid influx in

enslaved African men and women to Virginia in the early 18th century, along with children born to Black people living in Virginia over the last century, led Virginia's leaders in the 1760s to become even more wary of a revolt by the enslaved population (Taylor, 2013). Efforts were made to discourage slave imports and control the expansion of the Black population, though the imperial government largely vetoed such efforts to protect British slave traders (Taylor, 2013).

By the 1770s, the Indigenous population greatly diminished in comparison to the overall Virginia population, with many having been murdered or died from disease, intermixed with Black enslaved people, or fled westward (Ablavsky, 2010). However, particular members of the Nansemond peoples remained in the ERW. John Bass was an English colonist who married Elizabeth, the daughter of the leader of the Nansemond Nation, in 1638 (Wilkinson, 2019). They had eight children together who were baptized Christians, though they were exposed to particular aspects of Indigenous culture such as the language (Wilkinson, 2019). While the majority of the Nansemond peoples abandoned their reservation by 1744 and fled to the southwest to join the Nottoway peoples, the Bass family remained in Norfolk County (Wilkinson, 2019). In 1792, only three non-Christianized Nansemond people survived (with the last passing in 1806) and they sold their reservation lands, which were 300 acres along the Nansemond River (the Nansemond people were not recognized by the state as a tribe until 1985, and were not federally recognized until 2018; Encyclopedia Virginia, 2020).

During this period, many enslaved Indigenous people were winning cases of manumission, such as the pivotal 1772 *Robin v. Hardaway* case which argued that enslaving Indigenous people who had maternal lineages to free women was in fact illegal based on laws passed in 1662 (Ablavsky, 2010). Another pivotal case in 1772, *Somerset v. Stewart*, effectively changed the conversations surrounding slavery amongst the British and Virginia colonists. James

Somerset was enslaved in Virginia and when his master brought him to England, he attempted to escape and sought freedom in court under the premise that, while lawfully enslaved in Virginia, slavery was unlawful in England (Ablavsky, 2010). The judge ruled in favor of Somerset and he was freed that year (Ablavsky, 2010). By the onset of the American Revolutionary War in 1775, the British had begun to promise enslaved people freedom if they fought alongside the Loyalists (Taylor, 2013).

Virginia colonists were wary of a British invasion by 1774 and by that June were responding to British rhetoric that aimed to stir up a revolt amongst the enslaved people in Virginia (Taylor, 2013). In November 1775, the final royal governor of Virginia (John Murray, fourth Earl of Dunmore) announced that any servant or enslaved person willing to bear arms would be freed after British military service (Bilal, 2000). By early 1776, hundreds of enslaved people fled to Dunmore's encampments and ships in Norfolk to join the British (Bilal, 2000). The Virginia colonists quickly responded with rhetoric aiming to oust the British as hypocrites who only intended to re-sell Virginia slaves in the West-Indies and worked on formulating their own support amongst the enslaved, while simultaneously discouraging traitors through public floggings of captured escapees (Taylor, 2013). However, by December, Dunmore's men suffered a major defeat during the Battle of Great Bridge (present-day Chesapeake), and Dunmore quickly fled, leaving behind hundreds of enslaved people (many of whom were suffering from outbreaks of disease) to face the wrath of the Virginia colonists (Taylor, 2013).

Besides enslaved people who joined British forces in the first year of the Revolutionary War, many fought in the Virginia State Navy (established in late 1775 and operated until 1787) as pilots, seamen, and sailors (a trade that many slave-owners taught enslaved people in the ERW before the onset of the Revolutionary war; Bilal, 2000). These men often substituted for their

masters but were still considered slaves throughout their service (Bilal, 2000). Some were freed thereafter (as outlined in the 1782 act that stated all slaves who served ought to be emancipated) or received pensions; but did not receive the same pensions or land grants as White veterans (Bilal, 2000). British forces surrendered in 1781, and the newly founded U.S. began positioning itself as a world power with a strong military and commercial presence.

The Gosport Shipyard in Portsmouth, instituted by the British in 1767, was a prosperous naval and merchant facility that served as a key site during the Revolutionary War (Bilal, 2000). It was burned down in 1776, along with most of the city, which resulted in “a vast heap of ruins and devastation” (Parramore et al., 2000). In 1788, the Common Council began to adopt regulations to clear the “filth [and] garbage” that covered the area, where regulations were again tightened in 1794 (Parramore et al., 2000). That same year, the Gosport Shipyard was leased by the U.S. Government following the establishment of the Navy, and later became the Norfolk Naval Shipyard in 1862 (Brown, 1962; Parramore et al., 2000). By the turn of the century, the ERW began to transform from a rural, largely plantation-based economy to a leading site for naval and commercial activities. Exports rose from over a million dollars in 1792 to 2 million in 1795, and over 4 million in 1804 (Yarsinske, 2007). The Dismal Swamp Canal Project began in 1793, where enslaved people dug a canal to facilitate trade between Virginia and North Carolina (Yarsinske, 2007). It was opened to navigation in 1805 and continually widened to accommodate larger vessels throughout the 1830s (Yarsinske, 2007). The Elizabeth River was also dredged in the early 19th century to assist with trade activities and resulted in wetland and shallow-river habitat being destroyed and the loss of biodiversity throughout the river (Di Giulio & Clark, 2015).

While the 19th century economy of the ERW still relied on plantation activities (not only tobacco, but also cotton following the cotton revolution of the 1820s and 1830s) the region was also home to industrial activity, e.g., the wood treatment industry (Di Giulio & Clark, 2015; Parramore et al., 2000). Early European settlement led to the clearing of old growth forests and riparian habitats across the watershed (Di Giulio & Clark, 2015). The continuous need for decay-resistant wood (for the booming railroad and trade industries) led to the regional establishment of coal tar-derived creosote facilities for wood treatment in the 1830s (Di Giulio & Clark, 2015). It is unclear how many wood treatment facilities were in the ERW, though three of the major companies, Atlantic Wood Ind., Republic Creosoting Inc., and Eppinger and Russell Co., operated throughout most of the 20th century (Di Giulio & Clark, 2015).

Throughout the early 19th century and rise in commercial activity, there was a heavy reliance on the enslaved population. While the Governor of Virginia banned the importation of enslaved peoples into the state in 1778 (largely to control the possibility of insurrections), by 1800 over half of the ERW population owned slaves to work on plantations, dredging projects, railroads, wharves, and other prominent activities of the region (Taylor, 2013). Some Black people were freed following the Revolutionary War, though their societal status often was no higher than that of the enslaved (Bogger, 1976). By 1807, a law was passed to halt the rising rate of manumission and stated that any freed Black person must leave the state within one year or face being re-sold into slavery (Bogger, 1976). By 1820, the American Colonization Society began encouraging free and emancipated Black people to emigrate to Liberia (where the largest number of immigrants came from Virginia; Parramore et al., 2000).

The early 19th century was characterized by severe control over the Black population (freed and enslaved). Rhetoric following the Revolutionary War celebrating “freedom” and

“liberty” stirred conversations of hypocrisy amongst the enslaved population (Bogger, 1976). To control the possibility of a revolt, a law was passed in 1831 that outlawed teaching Black people how to read and write (Fen, 1967). A few months later, Virginia experienced its biggest insurrection by an enslaved, highly religious, educated man named Nat Turner, and four other enslaved people (Higginson, 1861). Turner and his party murdered 55 White people in the Southampton area (present-day Hampton) before being stopped by the state militia and eventually sentenced to death (Higginson, 1861). An estimated 200 Black people were murdered in retaliation following the revolt and laws were passed that restricted Black people from preaching, holding religious meetings, attending religious meetings at night, carrying firearms or weapons, having access to alcohol, etc. (Bogger, 1976; Higginson, 1861). There were brief discussions amongst Virginia’s leaders to abolish slavery due to the Nat Turner Rebellion, though the idea was quickly dismissed, and efforts were focused on limiting the rights of enslaved Black people and removing free Black people from the state (Bogger, 1976).

However, the abolitionist movement began to pick up around this time, and when the 1850 Fugitive Slave act (requiring enslaved people to be returned to their owners, even if they escaped to free states) was passed, even more Northerners began advocating for the abolishment of slavery (Bogger, 1976). Throughout the 1850s abolitionist press became increasingly available in the ERW, as did the numbers of enslaved people escaping to the North via the Underground Railroad (Bogger, 1976). When Abraham Lincoln was elected president in 1860, the possibility of civil war became apparent to Virginia’s leaders (Newby, 1992). In 1861, voters ratified Virginia’s secession from the U.S. and Union soldiers burned down the Norfolk Naval Shipyard (yet again) before withdrawing to the North (Bogger, 1976). Confederate soldiers built land batteries at Sewells Point (present-day Norfolk) to defend the Elizabeth River and forced Black

people to arm them (Newby, 1992). Many Black people were also sent to work at the Naval Hospital, Fort Norfolk, Craney Island, Tanner's Creek, Pig Point, St. Helena, Fort Boykins, Lamberts Point, and other key sites across the ERW (Newby, 1992).

In the Spring of 1862, Union forces regained control over the ERW, forcing most of the Confederate soldiers to abandon their slaves (Newby, 1992). In 1863, President Lincoln issued the Emancipation Proclamation, effectively freeing all enslaved people in Confederate states (Newby, 1992). Missionaries entered the ERW that same year and were able to provide education to Black people for the first time in 30 years (Fen, 1967). The Civil War ended in 1865, and the U.S. House ratified the 13th Amendment and abolished slavery and involuntary servitude (Newby, 1992). Despite the abolishment of slavery, many White people in Virginia still held prejudices against Black people and were unwilling for them to enter their world as equals.

1866-1959

The Civil Rights Act of 1866 declared that all persons born in the U.S. were citizens without distinction of race, color, or previous condition of slavery or involuntary servitude. While President Andrew Johnson vetoed this crucial bill, the Senate and House of Representatives voted to override the veto, and the law was ratified in April of 1866 (Moore, 1982). In celebration, Black leaders in Norfolk held a demonstration to show their support of the law (Moore, 1982). However, the celebration turned violent when an intoxicated police officer attempted to arrest a Black man and a crowd formed around the officer to stop the unjust arrest (Moore, 1982). The crowd chased off the intoxicated officer. However, a Confederate veteran responded by firing shots at the crowd and he in turn was killed (Moore, 1982). Armed White forces roamed the streets and murdered two Black people and wounded many others (Moore, 1982). While U.S. troops were sent to Norfolk to protect Black Americans and ensure that White

people did not have a monopoly on city procedures, Norfolk leadership asserted that they would attempt to prevent any “procession” by Black people (Moore, 1982). The Norfolk Riot of 1866 was an early example of the prejudices that many White people held following the Civil War and shaped the discrimination against Black people that was embedded within the Reconstruction and Jim Crow eras.

In 1865, Congress established the Freedmen's Bureau, which was meant to be a temporary agency to assist with the transition to freedom for Black people by providing food, housing and medical aid, legal assistance, schooling, etc. (Newby, 1992). The immediate months following the riot of 1866 were characterized by an increase in policing and the violation of the rights of Black people (Parramore et al., 2000). By October, the Freedmen’s Bureau found the civil courts in Norfolk unable to render justice to Black people and a Freedmen's Bureau Court was authorized to address the civil courts’ inability to take action in cases of violence and intimidation against Black people (Newby, 1992). While this seemed like a major step towards justice, the Court was largely impotent and understaffed, limiting their ability to effectively implement mandates to protect the rights of Black people (Newby, 1992).

The years following the Civil War were also crucial for Black people’s right to vote. In 1867, the Reconstruction Acts were passed which called for voters to be registered to districts outlined in the acts and for previously enslaved men to be included in this process (Newby, 1992). These acts stated that each state should draft governing documents to address Black male suffrage and required them to ratify the 14th Amendment (Newby, 1992). The elections in October of 1867 were the first time that Black people were able to exercise their right to vote in the ERW and 24 Black delegates (largely Republican) were elected to the Constitutional Convention being held that December (Newby, 1992). The convention approved the new

Virginia Constitution, which was meant to go into effect in 1868, and provided universal manhood suffrage, a uniform tax system, homestead exemption rights, a Bill of Rights regardless of race or color, the establishment of a public school system, and the election of school trustees by popular vote (Newby, 1992). However, the ratification of the new constitution was delayed until 1870, after the 15th amendment was ratified (Newby, 1992). By 1870, the number of Black people in the Norfolk area doubled (many migrated from other southern states) since the last census and Black leaders worked to increase the number of Black people registered to vote (Hucles, 1992). However, gerrymandering practices (the political manipulation of electoral district boundaries) began in 1871 which limited the political power of Black people to only one of the four wards in Norfolk (Hucles, 1992). Throughout the rest of the century, many White delegates worked to disenfranchise Black people and exclude them from the political arena (Newby, 1992).

Limiting education was a critical way in which Black people were disenfranchised. In July of 1866, Congress passed a bill that allowed the Freedmen's Bureau to cooperate with benevolent societies to increase funding for Black education (Newby, 1992). In October, only four schools designated for 1,200 Black students reopened in Norfolk (in comparison to the 10 schools that operated before) with only 10 teachers (Newby, 1992). In 1867, restrictions were set that stated only Black teachers were able to teach in Black schools and a rivalry for funding from benevolent societies between White and Black schools was prevalent (Newby, 1992). In 1870, a new law was passed which called for segregation of schools (Newby, 1992). In 1871, Black schools were finally established in each ward of Norfolk, though funding dwindled in comparison to that of White schools (Newby, 1992). By 1875, the shortage of funds was critical, and schools for Black students were overcrowded to the point that they had to turn many students

away (Newby, 1992). By 1876, only two Black schools were operating in Norfolk, though all of the White schools remained, and additional schools were not built until 1884 (Newby, 1992). For decades to come, schools designated for Black students were consistently underfunded and overcrowded, and rundown in comparison to White schools (Newby, 1992).

The defunding of education following the Civil War is in part linked to the millions of dollars in debt that were accrued throughout the war. By 1874, private debts were as high as 30 million and by 1877 hundreds of businesses were failing (Pearson, 1916). In 1879, a radical bi-racial political party, known as the Readjusters, formed and aimed to address the debt controversy by readjusting the principal and interest rates (Pearson, 1916). In 1882, the Riddleberger Act was passed which effectively lowered the principal of the debt and interest owed by some \$10 million (Pearson, 1916). The Readjuster party refinanced debts, increased funding for schools that served Black and White students, and abolished the 1876 poll tax (Moger, 1942). While the Readjuster party was a bi-racial group that did advance some rights of Black people, its White leaders largely followed the “separate but equal” doctrine that was prevalent in the South at this time (Boggs, 2003). However, by 1883, the party lost control to conservative Democrats, who believed that interracial alliances compromised White superiority (Boggs, 2003).

The Democratic Party remained in control of the political arena in Virginia throughout the rest of the century and made notable advances to disenfranchise Black people (Boggs, 2003). In 1894, the Walton act was passed which complicated voting ballots by removing all symbolic references and names of political parties (only listing the names of the individuals that were running) and required voters to cross out the names of every candidate except the one they were voting for (ballots that failed to do so were thrown out) which noticeably disenfranchised voters

with lower literacy skills (Boggs, 2003). In 1896, the notable *Plessy v. Ferguson* case reached the U.S. Supreme Court which approved the “separate but equal” doctrine (Boggs, 2003). This gave the Democratic Party the national backing they needed to call for a constitutional convention (Boggs, 2003). The convention was held in 1901, where a new constitution was approved that required a literacy test and poll tax for all voters except property owners, Civil War veterans and their descendants, and those paying annual taxes (Parramore et al., 2000). The new constitution went into effect in 1902 and further disenfranchised Black people who had lacked access to education and were often unable to pay the poll tax (Parramore et al., 2000).

The lines of segregation were clear in the ERW following 1902, where the “separate but equal” doctrine was particularly notable in housing and schooling (Parramore et al., 2000). Before the implementation of the new constitution, Black and White families lived side-by-side in a “keyboard pattern of alternating rows” (Ringelstein, 2015). However, in 1914, the first segregation-based city ordinance was passed in Norfolk which specified blocks intended for White people and blocks for Black people and made it unlawful for anyone to live on a block that was not associated with their race (Ringelstein, 2015). While the 1917 U.S. Supreme Court case, *Buchanan v. Warley*, found residential segregation to be unconstitutional, Norfolk leaders were able to maintain city ordinances on the premise that they were applied equally to all people (Ringelstein, 2015). Further, in 1924 the U.S. Supreme Court case, *Corrigan v. Buckley*, found restrictive covenants to be lawful, which allowed private groups (real estate agencies, housing developers, insurance companies, etc.) to make residential decisions based on race (Ringelstein, 2015). Intimidation was often used to enforce discriminatory city ordinances and restrictive covenants, which pushed Black people into undesirable areas (Ringelstein, 2015). The lack of

residential mobility, financial security, federal support, and private investments inevitably turned Black neighborhoods into blighted areas (Ringelstein, 2015).

Another critical law passed during this time was the Racial Integrity Act of 1924, which banned interracial marriages in Virginia and required racial identification on birth and marriage certificates (Encyclopedia Virginia, 2020). “White” people were defined as any person having no trace of African ancestry, leaving all other people to be defined as “colored” (Encyclopedia Virginia, 2020). In terms of the remaining Indigenous population in Virginia, they were listed as “colored” unless they could prove that they only had 1/16th or less Indigenous blood (Encyclopedia Virginia, 2020). In 1930, the law was modified to redefine “colored” people as those who had any “negro blood” (Encyclopedia Virginia, 2020).

By the 1930s, Norfolk leaders began to take seriously the clearing of “slums” and “blight” (Ringelstein, 2015). While complaints of blighted areas across the ERW were reported as early as the 1790s (following the area being burnt down during the Revolutionary War and again during the Civil War), the “slums” of the early 20th century were clearly divided along racial lines (Parramore et al., 2000; Ringelstein, 2015). In 1934, the National Housing Act was passed which created the Federal Housing Administration and the HOLC, which aimed to prevent home foreclosures, extend home mortgages by lowering interest rates, and make homeownership more affordable across the U.S. (Ringelstein, 2015). The HOLC conducted comprehensive surveys and worked with local real estate offices to divide ERW into neighborhoods with specific grades to determine which neighborhoods should receive mortgage support (Ringelstein, 2015). The grading system was based on four categories: A, B, C, and D or green, blue, yellow, and red (Ringelstein, 2015). Green areas were deemed the best, blue areas

were still desirable, yellow areas were in decline, and red areas were completely undesirable and not considered for mortgage support (“redlined” neighborhoods, Ringelstein, 2015).

Despite warnings from Black leaders that implementing slum clearing projects without adequately addressing unemployment rates among Black people would exacerbate the problem, Norfolk leaders moved forward with the projects (Ringelstein, 2015). In 1935, the City Manager of Norfolk created the Citizens Slum Committee which was tasked with noting “slum districts” and obtaining federal funds to clear them (Ringelstein, 2015). In 1937, the U.S. Housing Act reformed the 1934 law and established the U.S. Housing Authority which provided funding for the clearing of slums on the condition that cities build low-cost housing (Ringelstein, 2015). However, in 1939, the City Council of Norfolk voted against implementing the housing authority and instead decided to remove slums by forcing owners to abide by strict sanitary and building codes (Ringelstein, 2015). By 1940, the HOLC map displaying the grading system for the “Greater Norfolk and Surrounding Area” (Norfolk, Portsmouth, South Norfolk) was released and every neighborhood designated as red were Black neighborhoods (Fig. 2; Ringelstein, 2015). While financial institutions, realtors, developers, and urban planners had already been following discriminatory residential practices for decades, the publication of this map provided federal support to continue (Ringelstein, 2015).

The demand for low-cost housing across the ERW grew as military personnel in the area increased before the U.S. entered World War II (WWII; Ringelstein, 2015). Thus, Norfolk leaders decided to vote in favor of developing a housing authority to create adequate housing for Army and Naval personnel (Ringelstein, 2015). Of the 2,212 housing units constructed in 1940 and 1941, only 300 were designated for Black military personnel and numerous Black communities were displaced to make room for military housing (Ringelstein, 2015). By the end

of WWII, Black veterans came home to a housing crisis even worse than what it was before they left (Ringelstein, 2015). In 1946, the Norfolk Housing Authority was funded to build 500 housing units for displaced Black people, however, upon approval, the federal government reduced this to 309 units (Ringelstein, 2015). During construction, the number of units were cut again to 281 and by December, with 1,000 displaced veterans and families, the Federal Public Housing Authority (FPHA) eliminated the project due to the cost of labor and materials (Ringelstein, 2015). While 140 units were already half-constructed, the FPHA only authorized the completion of 50 units (Ringelstein, 2015).

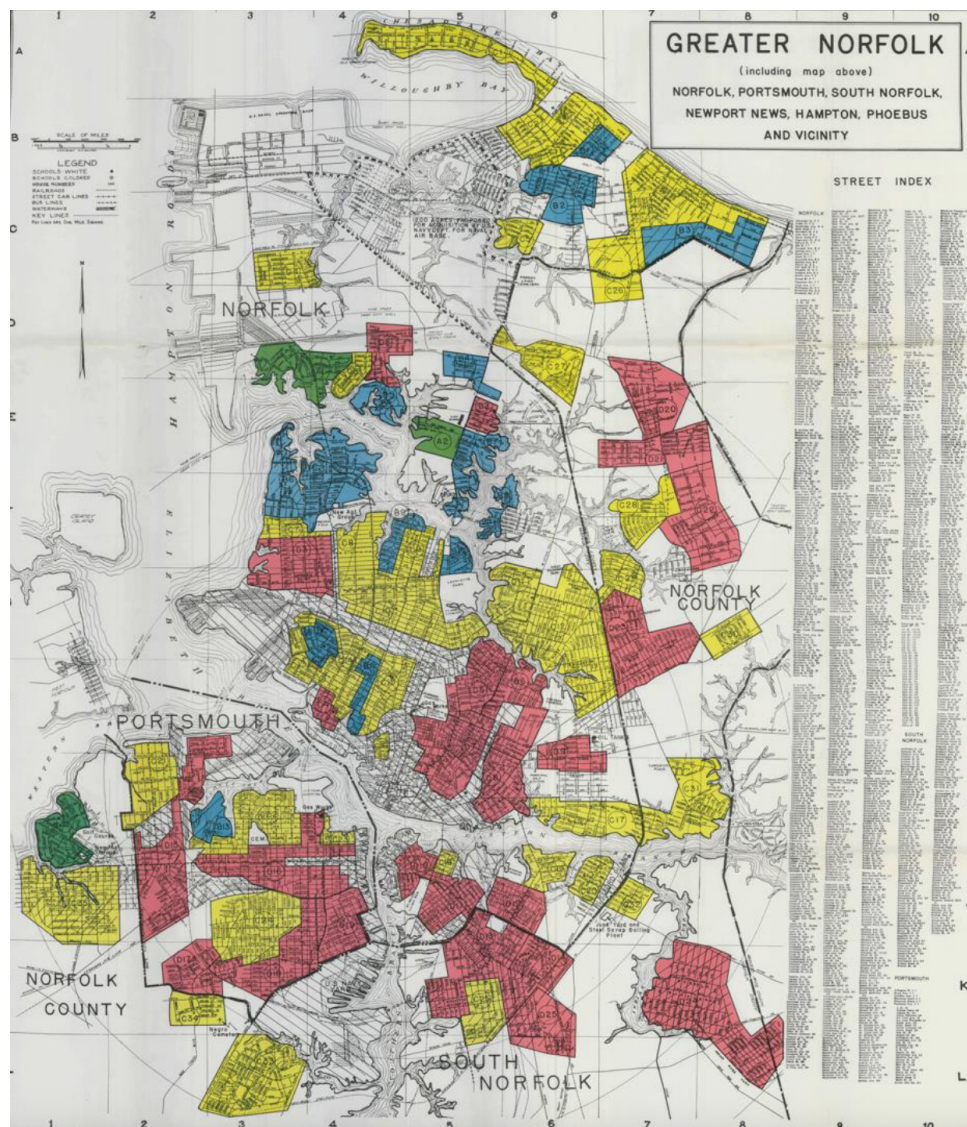


Figure 2. Map of the 'Greater Norfolk Area' created by the Home Owners' Loan Corporation to determine target areas for mortgage support (Ringelstein, 2015).

In 1949, a new federal housing act was passed which stipulated that “safe” and “sanitary” relocation methods must be in place for families that are displaced from housing project areas (Ringelstein, 2015). The act also provided additional funding for “clearing slums and rebuilding blighted areas” and Norfolk was granted immediate relief (Ringelstein, 2015). That same year, Norfolk leaders hired surveyors to create maps of the city that depicted Black neighborhoods and made recommendations for housing development projects (Ringelstein, 2015). To abide by the stipulation of “well-planned, integrated, residential neighborhoods” defined in the 1949 Housing act, the surveyors suggested that:

1) a neighborhood may be bounded, but not traversed, by major traffic arteries, 2) should contain its own school, and no elementary school children residing in it should have to cross any major traffic arteries on their way to and from school, and 3) should have its own community center building, and adequate playground facilities, should have easy access to minimum amount of shopping facilities for daily household supply and service (Ringelstein, 2015).

Following these guidelines, Norfolk started its first slum removal project in 1951 which cleared 127 acres in the downtown area and worked to strengthen segregated neighborhoods (Ringelstein, 2015).

In 1954, the U.S. Supreme Court overturned the 1896 *Plessy v. Ferguson* ruling in the *Brown v. Board of Education of Topeka* decision and declared that the separation of Black and White students in public schools was unconstitutional (Ringelstein, 2015). Following the ruling, the Norfolk Housing Authority quickly started the Atlantic City, Old Dominion, Broad Creek, and Downtown projects which bulldozed 800 acres of land and displaced nearly 20,000 people

(Ringelstein, 2015). These projects eliminated the relatively integrated neighborhoods in Atlantic City and Broad Creek and created “buffer zones” between White and Black communities (Ringelstein, 2015). Atlantic City was mostly converted into an industrial park and Old Dominion served as a convenient buffer zone between the working-class community of Lamberts Point and nearby wealthy subdivisions (Ringelstein, 2015). Ultimately, these projects, along with projects aiming to build interstate highways and recreation areas, served as barriers between Black and White neighborhoods and maintained segregated school districts (Ringelstein, 2015). The City of Norfolk was nationally recognized for their slum clearing projects in 1959 by *Look Magazine* and the National Municipal League who granted Norfolk with the All-America City Award (Ringelstein, 2015).

The Housing Authority projects that arose following the 1954 Supreme Court ruling serve as strong examples of the massive resistance to integration across the ERW. Further, in 1955, the Gray Plan was released by a legislative commissioner which sought to preserve segregation in schools by providing tuition grants to White students to attend private schools (and thus avoid integration), implementing a pupil assignment system to minimize race mixing by authorizing school boards to assign students to schools, and repealing the compulsory attendance law so that children would not be required to attend an integrated school (Doyle, 2005). In 1956, the plan was approved via a state-wide referendum and additional policies were passed that allowed funds to be cut off from school districts attempting to integrate and permitted the closing of integrated schools (Doyle, 2005). Immediately, Black parents began working with the National Association for the Advancement of Colored People (NAACP) to sue the school board (Doyle, 2005).

The notable 1956 *Beckett v. School Board of the City of Norfolk* case targeted the pupil placement law, as it allowed the school board to reject the applications of Black students who attempted to transfer to schools in White districts (Doyle, 2005). In 1957, the federal district court declared it unconstitutional to reject student transfer requests on the basis of race. However, the Norfolk School District was still able to deny 151 Black students due to their “health and safety, social adaptability, and place of residence” (Doyle, 2005). In 1958, a federal judge ordered the school district to reconsider the student applications, and the school board decided to admit only 17 Black students to attend schools historically limited to White students (Doyle, 2005). In response, Governor J. Lindsay Almond decided to shut down the schools in Norfolk to prevent school integration, which resulted in nearly 10,000 White students without access to education (Doyle, 2005). Schools remained closed in Norfolk for 5 months until school board members and educators voted in favor of reopening schools, not necessarily because they believed in school integration, but because they believed that the 10,000 displaced White students had the right to education (Doyle, 2005). On February 2nd, 1959, schools were finally reopened and 17 Black students (known as the Norfolk 17) joined thousands of White students in “integrated” schools, paving the way to educational access for Black people across the ERW (Doyle, 2005).

1960-Present

The 1960s marked a pivotal time for the advancement of civil rights for Black people across the country. The Civil Rights Act of 1960 required federal inspection of local voter registration polls and highlighted racially discriminatory voter registration practices (CWH III, 1960). In 1964, the 24th Amendment was ratified which prohibited poll taxes for federal elections and was a major step towards addressing barriers to voting for low-income people

(Richardson, 2019). However, the amendment did not address state elections, which allowed Virginia to continue to use poll taxes as a tool of disenfranchisement (Lesniak, 1966). In 1966 during the *Harper v. Virginia State Board of Elections* case, the U.S. Supreme Court found Virginia's poll tax to be unconstitutional and banned their use in state elections (Lesniak, 1966). Another notable case during this period was the 1967 *Loving v. Virginia* case, where the U.S. Supreme Court found laws banning interracial marriages to be unconstitutional and ended anti-miscegenation practices that had long existed in Virginia (including the Racial Integrity Act of 1924; Roberts, 2014). Despite such advances, Black people in the ERW still faced major barriers during the decades following the civil rights movement, particularly in terms of education.

The first 17 Black students to attend predominantly White schools in Norfolk faced racism and discrimination on a daily basis and, despite their sacrifices, many schools across the ERW remained segregated (Doyle, 2005). While the Civil Rights Act of 1964 outlawed legal segregation in public accommodations, White flight was common in the ERW throughout the 1950s and 1960s (particularly following the establishment of Virginia Beach and Chesapeake) which perpetuated segregation by keeping neighborhoods racially homogenous (Doyle, 2005; Parramore et al., 2000). In 1970, the *Brewer v. School Board for the City of Norfolk* case appealed a district court's approval of a desegregation plan which made no attempt to address how segregated neighborhoods produce segregated schools (Doyle, 2005). The case called for free inter-neighborhood busing to be included in the desegregation plan, as many students were unable to pay the \$63 yearly-fee to ride the city bus to and from school (Doyle, 2005). The busing plan was implemented in 1971, and by 1972 only 1 of 39 elementary schools in Norfolk remained a predominantly Black school (Doyle, 2005).

However, just as there was a major resistance to school integration in the 1950s, there was also a major resistance to inter-neighborhood busing in the 1970s (Doyle, 2005). White flight continued to rise throughout the 1970s where White families either moved to the suburbs or put their children in private schools (Doyle, 2005). By 1980, the Black population was 35% of the total population of Norfolk but made up 60% of the public school population (Doyle, 2005). In 1981, the Norfolk School Board announced their decision to end busing for elementary schools and return to neighborhood schools (Doyle, 2005). Their rationale was the following:

1) mandatory busing had not improved the academic achievement of Black students relative to White students; 2) a neighborhood school policy with voluntary options would end White flight and produce more long-term desegregation; and 3) neighborhood schools would improve the quality of education by increasing parental involvement in schools (Doyle, 2005).

The plan was approved in 1983 and Black parents immediately appealed the decision in court (Doyle, 2005).

The *Riddick v. School Board of the City of Norfolk* case claimed that the new school plan was racially motivated and violated the constitutional rights of Black students under the 14th Amendment (Doyle, 2005). However, the District Court Judge ruled that the plan was not discriminatory and that the previous busing plan resulted in the loss of 6,000-8,000 White students which was leading to “re-segregation” (Doyle, 2005). By Fall of 1986, busing at the elementary level ended and many schools returned to be either predominantly Black or White schools (Doyle, 2005). This limited young Black students to an environment of concentrated poverty with little opportunity for mobility (Littlejohn & Ford, 2012). Educational access for

Black students worsened following the 2000 city council elections, when the council moved to end inter-neighborhood busing at the middle school level as well (Littlejohn & Ford, 2012).

Throughout the 21st century, the Norfolk school system has raised standardized test scores and improved the high school graduation rate for all demographics (Littlejohn & Ford, 2012). However, when compared to White schools, Black schools continue to have lower test scores, graduation rates, and retention rates for instructors (Littlejohn & Ford, 2012). Further, predominantly Black schools are often in increasingly decrepit states with little resources and funding when compared to predominantly White schools (Littlejohn & Ford, 2012). Overall, predominantly Black schools have struggled with similar issues for over a century where a segregated school system has led to an achievement gap between White and Black students and is perpetuated by residential patterns and gentrification (Littlejohn & Ford, 2012).

Back in the Spring of 1960, after Norfolk received the All-American City award for their slum-removal projects, Black leaders protested and displayed signs saying “discrimination and segregation are not All-American” (Ringelstein, 2015). However, that did not stop the Norfolk Housing Authority from continuing their redevelopment projects. In 1965, the East Ghent District (a predominantly Black community) was declared as a conservation project and began to receive federal loans for “restoration” (Martin, 2022). Beginning in 1970, like the projects before it, houses were demolished and residents were displaced without resources to relocate, forcing them into the outskirts of Norfolk and industrialized areas of Portsmouth (Martin, 2022; Parramore et al., 2000). Similar projects continued throughout the remainder of the 20th century and into the 21st century (Littlejohn & Ford, 2012). By 2010, gentrification projects converted many parts of Norfolk into attractive areas for young professionals, however, there are still clear lines of segregation that separate the “ghetto” neighborhoods from the remainder of the city

(Littlejohn & Ford, 2012; Ringelstein, 2015). The discriminatory housing projects occurring since the early 20th century in the ERW have directly contributed to the achievement and wealth gap between Black and White people (Littlejohn & Ford, 2012; Reid, 2021), and likely have influenced their disproportionate exposure to environmental hazards (Taylor, 2014).

Throughout the 19th and 20th centuries, the ERW experienced rising industrialization, military, and commercial activities that led to substantial pollution of the Elizabeth River (Di Giulio & Clark, 2015). However, it was not until 1976, when the EPA and U.S. Congress required a report on the state of the river, that the Virginia State Water Control Board realized that the Elizabeth River was one of the worst polluted waterways in Virginia (Di Giulio & Clark, 2015). In the 1980s, researchers reported high levels of nutrients (nitrogen, phosphorous, potassium, etc.), bacteria derived from municipal effluents, pesticides from storm sewer runoff, heavy metals (lead, copper, zinc, mercury, etc.) and PCBs from various industrial sites, tributyltin (TBT) from the shipping and ship-repair industry, and creosote (which serves as a source of polycyclic aromatic hydrocarbons (PAHs)) from the wood treatment industry (Di Giulio & Clark, 2015). In 1993, the EPA listed the Elizabeth River as a top concern due to the high levels of pollution (Di Giulio & Clark, 2015).

Numerous sites across the ERW were beginning to be listed as Superfund sites, which are polluted locations that require extensive, federally-funded clean-up. In 1990, the Atlantic Wood Industries site (Portsmouth) was listed as on the EPA's National Priority List (NPL) due to the high levels of creosote and carcinogenic PAHs (EPA Superfund Site). The Abex Corp. site (Portsmouth) was also added to the NPL in 1990 due to high levels of heavy metals and PCBs (EPA Superfund Site). In 1997, the Norfolk Naval Base (Sewell's Point Naval Complex, Norfolk) was added to the NPL due to high levels of heavy metals, PCBs, petroleum-/oil-derived

compounds, munitions, and other known and unknown contaminants (EPA Superfund Site). In 1999, the Norfolk Naval Shipyard (Norfolk) was also added to the NPL, along with St. Julien's Creek Annex (Chesapeake) in 2000 for a similar composition of contaminants as the Naval Base site (EPA Superfund Sites). Lastly, the Peck & Iron Metal site (Portsmouth) was added to the NPL in 2009 due to high levels of heavy metals and PCBs (EPA Superfund Site).

To combat the high levels of pollutants and restore the river, the Elizabeth River Project (ERP) formed in 1991. After 30 years of serving the river and surrounding communities, the ERP released their 5th Watershed Action Plan. Therein they announced their commitment to achieve “fair and equitable restoration” through employing EJ screening tools (Elizabeth River Steering Committee, 2022). Thus, the remainder of this project will identify goals for addressing environmental injustice in the ERW, with a particular focus on utilizing the ERP's Elizabeth River Environmental Justice Tool¹.

III. Goals for Addressing Environmental injustice

A. Goal 1: Engaging Communities

While it is generally accepted that involving communities in green infrastructure, restoration, and other environmental practice-based projects greatly increase the likelihood of achieving project goals, many environmental practitioners fail to consider the historical and current social, political, and economic contexts behind community structure and behavior, and thus fail to effectively integrate community stakeholders into the decision-making process (Cross & Chappell, 2022; Clark & Miles, 2021). Failure to incorporate community stakeholders in environmental practice-based projects can worsen community skepticism and distrust in the utility and motives of such projects, escalate environmental gentrification, and ultimately

¹ <https://cmap2.vims.edu/EREJTool/>

intensify inequity in environmental practices. This process is encompassed in Robert Kuehn's "taxonomy" of environmental justice which includes four categories of justice: distributive, procedural, corrective, and social justice (Kuehn, 2000). Effective community engagement falls under procedural justice, in which communities ought to have equal concern and respect in the decision-making process including inclusiveness, representation, parity, and communication (Kuehn, 2000). Thus, the first goal to aid in addressing environmental injustice across the ERW is effective community engagement.

There are several assumptions that practitioners make when aiming to engage community stakeholders: 1) community members and researchers have the same goals, 2) community education and outreach alone will increase project support, and 3) the community will benefit from the environmental practices implemented (Cross & Chappell, 2022). Sole reliance on such assumptions fail to recognize the complex and intersectional conditions of the community and jeopardize the implementation of equitable and just environmental practices.

Studies rooted in community engagement were most successful when project goals were agreed upon amongst practitioners and community members, as consensus enhanced buy-in from the community and enabled long-term community stewardship (Cross & Chappell, 2022). However, conflict over project goals can arise due to perceived lack of interest by community members, undesirable community-wide changes, losses of or restrictions to cultural practices, impacts on livelihoods and financial stability, perceived disenfranchisement or exclusion during the decision-making process by practitioners, misunderstood environmental or social services as a result of the implementation of the practice, etc. (Cross & Chappell, 2022). Such conflicts can be reduced when community members are engaged in the decision-making process early on (i.e., during the planning process versus the pre-implementation process). However, the greatest

success is achieved when practitioners establish methods of engagement that intentionally incorporate the historical and current social, political, and economic realities of the community (Cross & Chappell, 2022).

Many studies that aim to engage communities in the implementation of environmental practices focus on education and outreach as mechanisms to enhance community support of projects (Cross & Chappell, 2022). While such efforts enhance environmental awareness, they often do not target the entire community or consider socioeconomic barriers to participation such as working full-time and being unable to attend community meetings (Cross & Chappell, 2022). Additionally, many education efforts focus on a Eurocentric viewpoint of the environment and fail to highlight culturally diverse perceptions, practices, and beliefs which can further exclude particular community members and lead to them not supporting environmental practice-based projects (Clark & Miles, 2021). A presumption that is often the catalyst behind education and outreach efforts is that communities have a lack of awareness of environmental issues. However, this is not always the case, especially for communities that face multiple issues (i.e., crime and violence, housing inequalities, financial instability, etc.) where some may take precedence over others (Cross & Chappell, 2022). Thus, future education and outreach efforts should transcend traditional efforts by examining the social, political, and economic state of communities. Examining such states would assist in rectifying barriers to participation, targeting community members that have been traditionally and systematically excluded, and incorporating environmental perceptions, practices, and beliefs into the education and outreach efforts that align with that of the community.

Historically marginalized communities often distrust practitioners due to historical and systematic discrimination and exclusion and resist environmental practice-based projects due to

fear of negative impacts (Cross & Chappell, 2022). Such fears are rooted in the concern that practitioners and projects value ecological productivity over community well-being and do not consider the repercussions associated with implementation of environmental practices such as losses of livelihoods and environmental gentrification (Cross & Chappell, 2022). Environmental gentrification describes the process by which communities are transformed to include environmental amenities like green infrastructure which results in increases in housing prices and the displacement of BIPOC and low-income residents by wealthier residents (Mullenbach & Baker, 2020; Rigolon et al., 2020). Further, research suggests that BIPOC and low-income residents reap fewer of the health benefits associated with environmental gentrification projects, and often face negative impacts to their mental health in terms of their perception of safety in green spaces (Jelks et al., 2021). Thus, practitioners aiming to engage communities from historically marginalized backgrounds must cultivate relationships with community members over time and build trust and transparency to fully understand their concerns and perceptions of environmental practices. Further, practitioners should partner with public agencies and nonprofit organizations that work with the community, to ensure that the environmental practices implemented are ingrained in equity. This could be realized through building green infrastructure on-point to serve community needs, but not large enough to attract outside investors and potential buyers (“just green enough”), while also implementing affordable housing initiatives that surround environmental amenities (Rigolon et al., 2020).

Ultimately, to effectively involve communities, environmental practice-based projects should: 1) prioritize community engagement efforts from the beginning and plan to build long-term relationships; 2) conscientiously reflect upon the historical and current social, political, and economic realities of the community and modify project efforts to align with such

realities (i.e., rectify barriers to participation, modify educational efforts to include culturally appropriate viewpoints, etc.); and 3) build relationships with local agencies and nonprofit organizations to ensure that policies and initiatives are in place to protect communities from the repercussions of environmental amenities.

B. Goal 2: Mapping Distributions

One of the major uses of EJ screening tools is to map the distribution of various indicators to identify communities most vulnerable to environmental injustice (Cushing et al., 2015; Driver et al., 2019; Kramar et al., 2018; Kuruppuarachchi et al., 2017; Sadd et al., 2011). Studies have traditionally focused on indicators of pollution burden, socioeconomic status, and health (Cushing et al., 2015; Driver et al., 2019; Kuruppuarachchi et al., 2017; Sadd et al., 2011), though some have examined political practices such as gerrymandering (Kramar et al., 2018). Mapping distributions of such indicators falls under the distributive justice framework, in which communities have the right to equal treatment and ought to have equitable distribution of burdens, assets, and opportunities with the goal of minimizing disproportionate risks (Kuehn, 2000). Thus, the second goal to aid in addressing environmental injustice across the ERW is mapping the distribution of indicators of exposure and proximity to hazards (environmental hazard indicators), demographics and health (social indicators), and institutional practices and access (institutional indicators).

Indicators of environmental hazards are primarily used to understand stressors present in the environment that may act as drivers of environmental injustice (Sadd et al., 2011). They often include data on proximity to various hazardous sites, exposure to hazardous materials, and measures of risk/hazard based on proximity and exposure to understand impacts on environmental, social, and physical health (Driver et al., 2019; Kuruppuarachchi et al., 2017).

Social indicators are generally deployed to understand the social stressors based on population characteristics present in a community that may also drive environmental injustice (Sadd et al., 2011). They often include data on demographics and health to understand which groups within a community may be particularly sensitive to environmental hazards (Driver et al., 2019; Kuruppuarachchi et al., 2017). Institutional indicators are primarily used to understand how institutional practices and access may drive environmental injustice (Kramar et al., 2018). They may include data on historical and current practices and policies such as redlining, gerrymandering, zoning laws, and access to resources (i.e., medical centers, grocery stores) to understand practices of institutional racism and discrimination that may amplify disproportionate exposure to hazards and subsequent health risks (Kramar et al., 2018).

Overall, mapping the distribution of environmental hazard, social, and institutional indicators assist in identifying communities near hazardous sites and experience inordinate exposure to environmental hazards, that have marginalized identities and high health risks, and are governed by inequitable institutional practices. Such communities are vulnerable to environmental injustice and should be prioritized for community engagement to implement equitable environmental practices.

C. Goal 3: Measuring Equity in Environmental Practices

While environmental practice-based projects and initiatives have been implemented around the United States for decades, only recently have studies focused on assessing equity in such projects and initiatives to understand how well they address environmental injustice (Clark & Miles, 2021; Garrison, 2021). The most widely used model for sustainable environmental practice-based projects consists of environmental, economic, and social pillars (Clark & Miles, 2021). This model aims to deviate from the traditional economic-based approaches and

incorporate social and ecological perspectives. Though the social pillar, built around equity and justice, has largely been neglected due to perceived difficulties in realizing and operationalizing the practice (Clark & Miles, 2021). Measuring equity in environmental practices is built around the distributive and procedural justice frameworks. Here, communities have both the right to the equitable distribution of environmental amenities and to participate in the decision-making process during the creation and implementation of environmental practice-based projects. Thus, the third goal to aid in addressing environmental injustice across the ERW is measuring equity in environmental practices.

Measuring equity in environmental practices goes beyond simply mapping distributions of risks by identifying and rectifying unequal access to environmental amenities across communities (Clark & Miles, 2021). For example, environmental practitioners have widely advocated planting trees to increase green spaces across communities, as they can be linked to lowered air temperatures, improved air quality, lower energy consumption/costs, and thus better overall community health (Garrison, 2021). While many practitioners have recognized that BIPOC and low-income communities often have the lowest ratio of trees to pavement, many of the major tree-planting initiatives do not prioritize these communities, even when they claim that projects center around environmental justice (Garrison, 2021). Further, those that did prioritize BIPOC and low-income communities often failed to clearly define quantifiable metrics of success and, thus, do not commit fully to planting in priority areas or planting an adequate number of trees to offset environmental burdens like heat islands, and adopting statistical measures of distributional equity (Garrison, 2021). Such projects often focused on goals like “planting a million trees total”, assuming that this would inevitably enhance environmental

justice. Often, they failed to have contingency plans in place for the community to deal with repercussions like environmental gentrification (Garrison, 2021).

To build equitable environmental practices, practitioners must understand the historical and current social, political, and economic contexts of the communities they are working in (including honoring tribal sovereignty), as well as build long-term relationships with community members from the beginning to ensure that equity and justice are at the forefront of environmental practice-based projects. Further, practitioners should work with community stakeholders (community members, grassroots organizations, and public agencies) to define quantifiable metrics of success that go beyond simple descriptive metrics (i.e., number of trees) to include statistical measures for distributional equity (i.e., geographically weighted regressions), while including methods for continued monitoring and evaluation to ensure long-term success. Environmental practitioners should also work with community stakeholders to ensure policies and initiatives are in place, such as affordable housing policies, to offset repercussions of environmental amenities on BIPOC and low-income communities.

IV. Environmental Justice Screening Tool Indicators & Scoring Methodology

This section aims to review the current indicators in the Elizabeth River Environmental Justice Tool and make recommendations for additional indicators that will assist with the goal of mapping the distributions of environmental hazard, social, and institutional indicators. It includes a vulnerability scoring methodology to determine a cumulative impact score which can be used to identify communities most vulnerable to environmental injustice based on the environmental hazard, social, and institutional indicators. Further, it highlights indicators of environmental amenities, burdens, and practices which will assist in understanding if their distribution is

equitable and if they serve the communities most vulnerable to environmental injustice based on their cumulative impact score.

A. Environmental Hazard Indicators

The current indicators of environmental hazards included in the EJ tool for the Elizabeth River are Virginia Pollutant Discharge Elimination System (VPDES) permit outfalls, Superfund sites and brownfields, and shipwrecks. The tool also includes an Environmental Vulnerability Indicator Score, which includes the pollution and sources indicators used in the national EJScreen: EJ Screening and Mapping Tool² launched by the EPA (PM2.5, ozone, diesel particulate matter, air toxics cancer risk, respiratory hazard, traffic proximity and volume, lead paint, risk management plan proximity, hazardous waste proximity, and wastewater discharge). Additionally, the tool includes a Hazardous/Toxic Index Score, which includes data on proximity to Superfund sites, hazardous waste sites, sites with toxic chemicals, sites that emit air or water pollution, and sites that store oil. While the environmental hazard indicators in the tool span a range of hazards often linked to environmental injustice, adding indicators that are specifically relevant to the ERW region could be beneficial for determining the impact of region-specific hazards.

For example, this project highlights the PAH contamination derived from wood-treatment plants operating in the ERW since the 1800s. While restoration projects starting in the 1990s have reduced contamination, monitoring has shown that PAH-hotspots still exist (Elizabeth River Steering Committee, 2020). Research has mapped historic data on total PAH concentrations in sediment from 1985 to 2012 and found hotspots along the middle reach of the Elizabeth River (Prossner et al., 2022; Fig. 3). Therefore, PAH concentration should be added as an indicator of

² <https://ejscreen.epa.gov/mapper/>

environmental hazard where data can be obtained from the NOAA Diver Database³ and focus on total PAH concentration in sediment (data on other matrices are available but PAHs typically partition to sediment due to their high hydrophobicity and lipophilicity).

Other pollutants that are common in the ERW are heavy metals, PCBs, and TBT. The heavy metal and PCB pollution is largely derived from the various brownfields and Superfund sites. Thus, vulnerability to these pollutants is likely captured through the proximity to brownfield and Superfund site indicators, along with the indicators included in the Hazardous/Toxic Index score. Monitoring has shown that the toxic effects of TBT have mostly disappeared from the ERW, suggesting that TBT likely no longer poses a threat to the ecosystem (Elizabeth River Steering Committee, 2020). Further, TBT is primarily toxic to crustaceans, and has limited impact on humans (Di Giulio & Clark, 2015). Thus, due to low concentrations detected in the Elizabeth River, limited human toxicity, and restricted monitoring data, it is likely appropriate to exclude TBT from the Elizabeth River EJ tool.

Additional indicators for water quality are likely needed for the Elizabeth River EJ tool. The Eastern Branch (particularly Broad Creek and Indian Creek) has been designated a high concern for restoration activities since 2014, and recent monitoring shows that these areas require improvement due to high Enterococcus bacteria, chlorophyll, dissolved oxygen, phosphorus, and nitrogen levels (Elizabeth River Steering Committee, 2020). However, the Hazardous/Toxic Index Score and the Combined Environmental Vulnerability Indicator in the Elizabeth River EJ tool scored the U.S. census blocks surrounding Broad and Indian Creek as low to moderate vulnerability. This suggests that there may be additional indicators (such as those related to water quality) missing from the tool that provide a more holistic view of community vulnerability.

³ <https://www.diver.orr.noaa.gov/>

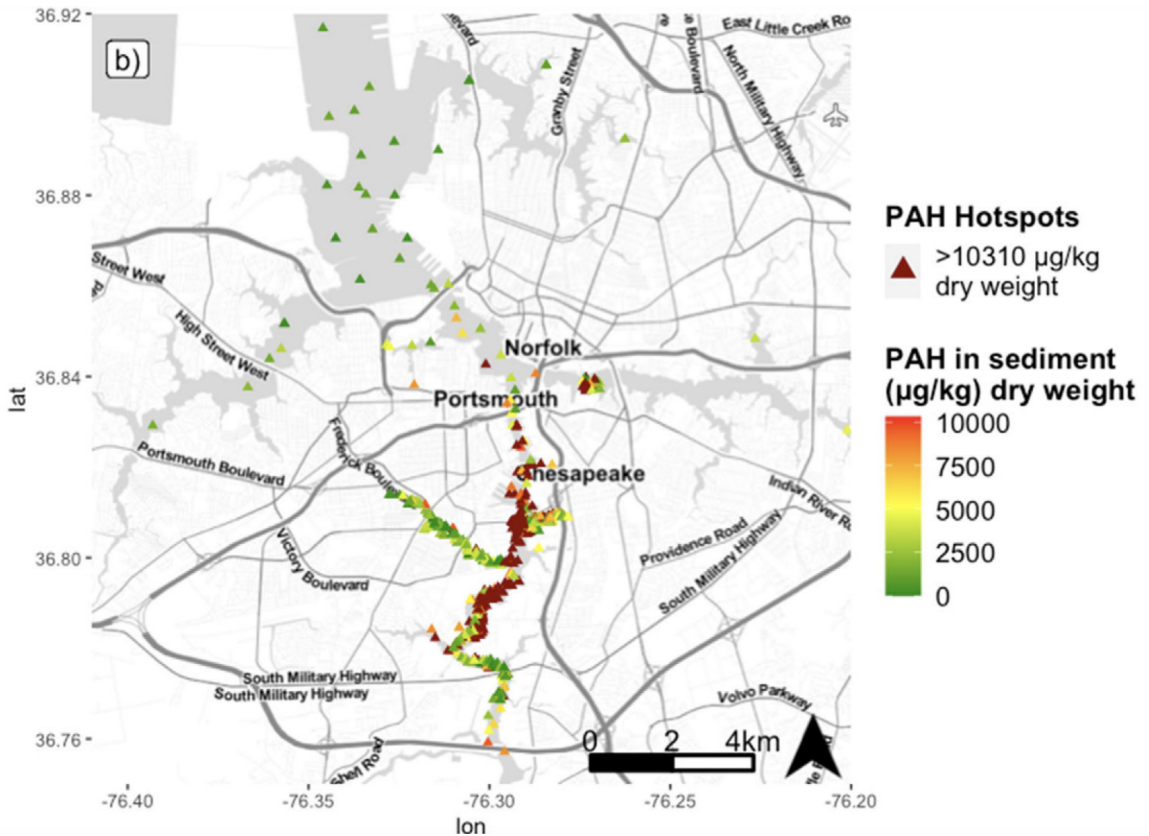


Figure 3. Map of total PAH concentration in sediment from 1985 to 2012 derived from the NOAA Diver Database (Prossner et al., 2022).

Overall, the environmental hazard indicators in the Elizabeth River EJ tool include most of the relevant data for proximity to various hazardous sites, exposure to various hazardous materials, and measures of risk/hazard based on proximity and exposure. However, adding data for PAH concentrations and water quality (measures of Enterococcus bacteria, chlorophyll, dissolved oxygen, phosphorus, and nitrogen levels) may improve the Hazardous/Toxic Index Score and the Combined Environmental Vulnerability Indicator Score.

B. Social Indicators

The Elizabeth River EJ tool includes a Demographic Vulnerability Indicator Score which includes data from 17 indicators: percent low-income, percent POC (includes races/ethnicities

other than White alone), percent less than high school education, percent linguistic isolation (includes households in which all members aged 14 years and over speak a language other than English, and have difficulty speaking and understanding English), percent individuals over 64 years old, percent individuals under 5 years old, median age structure, median household income, percent income below poverty, percent renter, percent Black people, percent Black household, percent at least a bachelor's degree, percent no internet, percent not in labor force, percent public assistance, and developed areas. Additionally, the tool includes a Social Vulnerability Index Score, which includes data on the per capita income, percent Black people, percent Hispanic people, percent Indigenous people, percent over 65 years old, percent not in labor force, percent income below poverty, percent less than high school education, percent in nursing homes or prisons, percent female labor force, percent households with female heads, and percent with social security income. While the social indicators included in the tool span most of the vulnerable demographic groups that are disproportionately affected by environmental injustice, adding health indicators would assist in identifying populations that are particularly sensitive to environmental hazards.

EJScreen has health disparity indicators which include low life expectancy, heart disease, and asthma, where the low life expectancy data came from the U.S. Small-area Life Expectancy Estimates Project (USALEEP)⁴ and the heart disease and asthma data came from PLACES: Local Data for Better Health⁵ dataset, both of which are housed under the Centers for Disease Control and Prevention (CDC). These data would be useful to include in the Elizabeth River EJ tool to understand health disparities across the ERW. The PLACES dataset also includes data for arthritis, high blood pressure, cancer, high cholesterol, kidney disease, chronic obstructive

⁴ <https://www.cdc.gov/nchs/nvss/usaleep/usaleep.html>

⁵ <https://www.cdc.gov/places/index.html>

pulmonary disease (COPD), diabetes, depression, obesity, stroke, and complete teeth loss rates across the ERW. Some of these data (particularly cancer and COPD rates) may be useful to add to the tool to render a more complete understanding of health disparities that could be linked to exposure to environmental hazards.

Ultimately, the Elizabeth River EJ tool covers a wide range of demographic indicators which captures the demographic groups that are often disproportionately exposed to environmental hazards. Though, health indicators should be priority additions to the tool. Minimally, low life expectancy, asthma, and heart disease data should be added, but there are other health disparity data included in the PLACES dataset that may also be beneficial to add. Engaging with the local community to understand the health disparities most pertinent in the area would assist in selecting additional health indicators.

C. Institutional Indicators

The current institutional indicators in the Elizabeth River EJ tool are infrastructure types (fire stations/EMS stations, law enforcement, ambulance services, hospital/medical centers, schools, and cemeteries) and redlined neighborhoods. However, there are additional institutional practices that may exacerbate vulnerability to environmental injustice.

EJScreen includes critical service gap indicators which encompass medical underservice, food deserts, and major broadband gaps. Medically underserved areas contain few primary care providers, and exhibit high infant mortality, poverty, and elderly populations. The medically underserved data cannot be downloaded from a single source, but instead is an index of the percent poverty level, percent over age 65, infant mortality rate, and medical underservice which is based on the medically underserved area and medically underserved population scoring⁶. The

⁶ <https://bhw.hrsa.gov/workforce-shortage-areas/shortage-designation/scoring>

food desert data is based on a low-income and low-access index, where the food access data can be downloaded from Food Access Research Atlas⁷. The broadband gap data are based on areas with the lowest rate of households with a broadband internet subscription and is from the Census Bureau's American Community Survey 5-year Summary Estimates⁸.

Other institutional practices that are not included in EJScreen, but still may be applicable to include in the Elizabeth River EJ tool are data on gerrymandering and health insurance. Gerrymandering occurs when political groups alter voting district boundaries to favor a particular party, which can perpetuate political power inequalities (Kramar et al., 2018). Recent research suggests there is a relationship between gerrymandering (district complexity) and proximity to hazardous sites (Kramar et al., 2018; Lind, 2022). Therefore, adding data on gerrymandering in the ERW may be useful to understand inequalities in political power which may ultimately influence the siting of hazards. Additionally, adding data on health insurance coverage across the ERW would be helpful for understanding community vulnerability to health issues due to exposure to environmental hazards. Data on health insurance coverage across the ERW are available through the 500 Cities Project⁹ funded by the CDC.

Overall, institutional indicators that provide information on medical underservice (i.e., health insurance) and food access (i.e., grocery stores, fast food locations) would be useful to add to the Elizabeth River EJ tool to better understand the availability of basic health needs across the ERW and how these may exacerbate vulnerability to environmental injustice (data on broadband gaps are encompassed in the percent no internet indicator which is currently included as a social indicator). Further, data on gerrymandering would also be useful to add to ensure there are indicators of political power in the tool. Building relationships with community

⁷ <https://www.ers.usda.gov/data-products/food-access-research-atlas/download-the-data/>

⁸ <https://www.census.gov/data/developers/data-sets/acs-5year.html>

⁹ <https://www.cdc.gov/places/about/500-cities-2016-2019/index.html>

members would also be useful for gaining feedback on additional indicators of institutional practices that may be needed for the tool.

D. Vulnerability Scoring Methodology

A vulnerability scoring methodology combines indicators into a relative cumulative impact score that is useful to identify communities vulnerable to environmental and social stressors (Cushing et al., 2015). Many EJ tools have vulnerability scoring methodologies that focus on pollution burden (consisting of exposure and environmental effects) and vulnerable populations (consisting of sensitive populations and socioeconomic factors) to determine cumulative environmental health impacts (Cushing et al., 2015; Zeise & Blumenfeld, 2021). However, this project presents a vulnerability scoring methodology that goes beyond traditional scoring methodologies to include institutional indicators along with environmental hazard and social indicators.

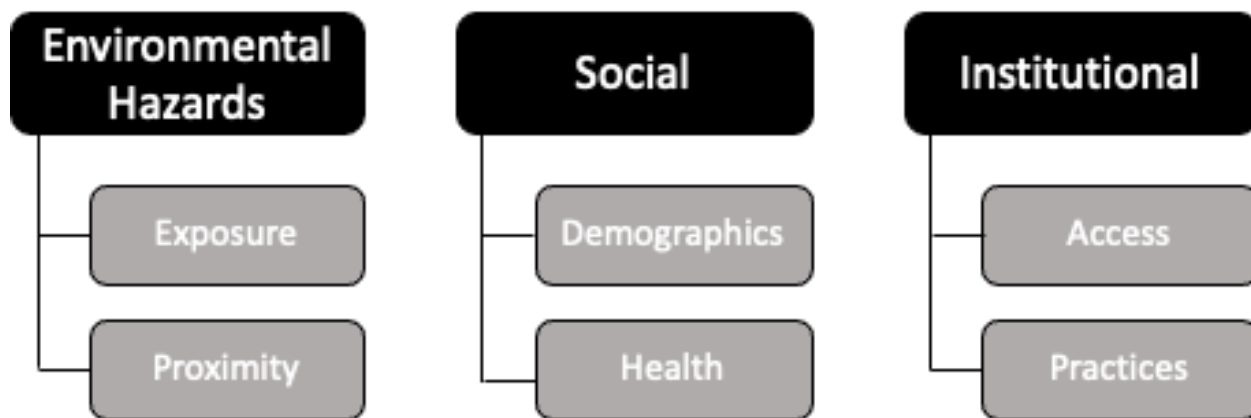


Figure 4. Components of the environmental hazard, social, and institutional indicators.

The indicator types (i.e., environmental hazards, social, and institutional) each contain two components (Fig. 4). The percentiles for each indicator within the components are averaged across components to create an overall score for that indicator type (Fig. 5). The overall scores

are scaled to have a possible range from 0 to 10 by dividing by the maximum value observed and multiplying by 10 (Fig. 5). Following scaling, the overall score for each indicator type is multiplied to calculate the cumulative impact score (Fig. 5). The maximum cumulative impact score is 1000, since each indicator type has a maximum score of 10. Certain components like “proximity” under environmental hazards and “practices” under institutional should only be weighted by half as these indicators have an indirect effect. For example, exposure to hazards via proximity to a Superfund site is an indirect exposure versus directly inhaling PM 2.5. Additionally, community vulnerability to environmental injustice as a result of living in a redlined neighborhood has an indirect effect versus directly being denied medical service. A cumulative impact score is calculated for each census block, then blocks are ordered from highest to lowest score. A percentile can then be created based on the scores from each census tract and mapped to visualize vulnerable communities.

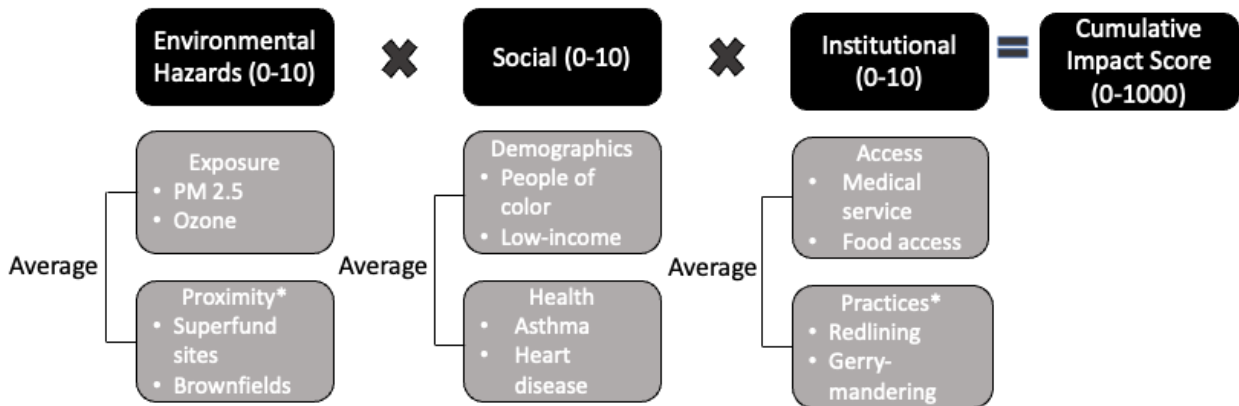


Figure 5. Vulnerability scoring methodology where the components of each indicator type are averaged, followed by multiplying each indicator type to calculate the cumulative impact score. Each component includes examples of indicators that fall under that type. * Indicates that the component is only weighted by half.

E. Environmental Amenity, Burden, and Practice Indicators

Indicators of environmental amenities, burdens, and practices can be added to an EJ screening tool to understand how equitably distributed they are in relation to vulnerable communities identified through the vulnerability scoring methodology. Environmental amenities, burdens, and practices that are already included in the Elizabeth River EJ tool are shoreline restoration projects (defended shorelines, living shorelines, and target areas for shoreline restoration), natural resources (wetlands and tree canopy), public green space, access to waterfronts (public/private access) and sea level rise and storm surge estimates. These indicators encompass what is included in EJScreen (outside of drought and wildfire risk, however, these indicators are not applicable to the ERW), and are likely sufficient to begin understanding how equitably distributed these factors are in relation to vulnerable communities identified through the vulnerability scoring methodology. Though, an additional indicator that includes data on condemned shellfish or finfish advisory areas areas would be useful, as many pollutants (PAHs, TBT, PCBs, etc.) across the ERW are found in high concentrations in certain biota (Di Giulio & Clark, 2015).

*Table 1. Environmental Hazard, Social, Institutional, and Environmental Amenity, Burden, and Practice Indicators existing in the Elizabeth River EJ Tool and suggested indicators to add. * May be more appropriate as Institutional Indicators.*

	Environmental Hazard Indicators	Social Indicators	Institutional Indicators	Environmental Amenity, Burden, Practice Indicators
	-VPDES -Superfund sites -Brownfields -Shipwrecks -PM 2.5 -Ozone	-% POC -% Low-income -% Less than high school -% Linguistic	-Fire stations/ EMS stations -Law enforcement -Ambulance services	-Defended shorelines -Living shorelines -Target areas for shoreline restoration

<p style="text-align: center;">Existing Indicators</p>	<ul style="list-style-type: none"> -Diesel particulate matter -Air toxics cancer risk -Respiratory hazard -Traffic and volume -Lead paint -Risk management plan -Hazard waste sites -Wastewater discharge -Toxic chemicals sites -Air/water toxics emissions sites -Oil-storing sites 	<ul style="list-style-type: none"> isolation -% Over 64 -% Under 5 -% Income below poverty -% Renter -% Black people -% Hispanic/Latino (a/x/e) -% Indigenous people -% Black household -% At least bachelors -% without internet * -% not in labor force -% public assistance * -% in nursing homes or prisons -% Female labor force -% Female household heads -% Social security income -Median age -Median income -Developed area * 	<ul style="list-style-type: none"> -Hospital/medical centers -Schools -Cemeteries -Redlined neighborhoods 	<ul style="list-style-type: none"> -Wetlands -Tree canopy -Public green space -Public access to waterfronts -Private access to waterfronts -Sea level rise estimates -Storm surge estimates
<p style="text-align: center;">Suggested Indicators</p>	<ul style="list-style-type: none"> -PAH -Enterococcus bacterial level -Chlorophyll 	<ul style="list-style-type: none"> -Asthma -Heart disease -Low life expectancy 	<ul style="list-style-type: none"> -Health insurance coverage -Grocery stores 	<ul style="list-style-type: none"> -Condemned shellfish or finfish advisory areas

	-Dissolved Oxygen -Phosphorus -Nitrogen	-Cancer -COPD	-Fast food locations -Gerry-mandering	
--	---	------------------	--	--

V. Conclusion

This project aimed to: 1) understand the social, political, and economic context behind environmental injustice; and 2) generate goals to address environmental injustice with a particular focus on utilizing EJ screening tools. The first objective was achieved by exploring EJ theoretical frameworks and the historical context of social oppression and environmental pollution in the ERW. This project highlights five EJ theoretical frameworks that can be used to explain disproportionate exposure to environmental hazards: 1) Racism and Discrimination; 2) Exploitation, Manipulation, Enticement, and Intimidation; 3) Institutional Practices; 4) Economics; and 5) Physical Characteristics. Overall, evidence of most of the theoretical frameworks can be found throughout the history of the ERW. Tenants of the Racism and Discrimination Framework is widely present in the pre-1705 and 1705-1865 time frames. Following the Civil War, the Exploitation, Manipulation, Enticement, and Intimidation Framework begins to dominate, where tenants of the Institutional Practices and Economics Frameworks begin to appear in the early 20th century and exist throughout the historical analysis to the present-day. Evidence of the Physical Characteristics Framework was not necessarily highlighted in the historical analysis. However, this may be due to many hazardous facilities in the ERW being founded in the late 18th and early 19th centuries.

While many of the hazardous facilities in the ERW were sited centuries ago, the population composition, residential segregation patterns, and market dynamics have changed over the centuries. This raises the “chicken-or-egg” debate, which aims to discern which came

first - the facilities or the people (Taylor, 2014)? However, EJ scholars suggest that there is a better question to understand disproportionate exposure - what keeps residents there (Taylor, 2014)? The fundamental question of residential mobility is encapsulated in the Institutional Practices and Economics Frameworks which explore how disproportionate exposure is linked to residential sorting patterns and economic behavior (Taylor, 2014). This suggests that while the “chicken-or-egg?” question may not be applicable, the “what keeps residents there?” definitely is.

The second objective was achieved by using the social, political, and economic context of communities within the ERW to generate goals to begin addressing environmental injustice. The disproportionate exposure to environmental hazards across the ERW can be explained through a combination of the five EJ theoretical frameworks, all of which highlight the need for empowering BIPOC and low-income communities through equitable and just community engagement. Upon reviewing the social, political, and economic context of the ERW, BIPOC and low-income communities have been continually promised changes to their residential environment (i.e., slum-clearing projects), though such changes have consistently failed to be actualized (Ringelstein, 2015). Thus, community residents rightfully distrust outsiders, which makes transparency, long-term commitment, sharing power etc. ever more important for community engagement efforts.

Understanding the EJ theoretical frameworks for disproportionate exposure to environmental hazards and applying those frameworks to the history of the ERW facilitated the identification of additional indicators for the Elizabeth River EJ Tool that may provide a more complete portrayal of potential vulnerable communities. This project has highlighted an alternative vulnerability scoring methodology which consists of environmental hazard (exposure

and proximity), social (demographics and health), and institutional (access and practices) indicators. While the Elizabeth River EJ Tool included indicators of institutional access and practices, these data were considered social factors. Adding a separate indicator type for institutional access and practices would assist in creating a more accurate portrayal of vulnerable communities, as the institutional indicator type includes data that are only half-weighted (i.e., institutional practices are only weighted by half in comparison to data regarding access). Further, this project highlights an indicator type that, while not necessarily included in the calculation of a cumulative impact score, should be added to EJ screening tools to assist in ensuring equity for vulnerable communities: environmental amenity, burden, and practice indicators. Such factors can help ensure that environmental amenities and burdens are equitably distributed, and that environmental practices are targeting the most vulnerable communities.

Overall, this project suggests that PAH and water quality (i.e. Enterococcus bacteria, chlorophyll, dissolved oxygen, phosphorus, and nitrogen levels) data should be added to the Elizabeth River EJ Tool, as these are pollutants that have been recently detected in the Elizabeth River (Elizabeth River Steering Committee, 2020). Further, health indicators (i.e., asthma, heart disease, low life expectancy, cancer, COPD rates) should be added to the tool to identify particularly sensitive populations. Additional institutional indicators recommended for inclusion in the tool are health insurance coverage, grocery store access, fast food locations, and measures of gerrymandering practices. While the environmental amenity, burden, and practice indicator type was particularly well covered in the Elizabeth River EJ tool, adding data on condemned shellfish or finfish advisory areas would be particularly relevant for the ERW. While the Elizabeth River EJ tool may benefit from additional indicators, it serves as a strong start to

identifying vulnerable communities in the ERW and building collaborative networks to address environmental injustice.

VI. References

- Ablavsky, G. (2010). Making Indians White: The judicial abolition of native slavery in revolutionary Virginia and its racial legacy. *U. Pa. L. Rev.*, 159, 1457.
- Albright, R. (2013). Death of the Chesapeake: A history of the military's role in polluting the bay. *John Wiley & Sons*.
- Bilal, K. (2000). Black pilots, patriots, and pirates: African-American participation in the Virginia state and British navies during the Revolutionary War in Virginia.
- Billings, W. M. (1991). The law of servants and slaves in seventeenth-century virginia. *The Virginia Magazine of History and Biography*, 99(1), 45-62.
- Blauner, R. (1969). Internal colonialism and ghetto revolt. *Social problems*, 16(4), 393-408.
- Blondell, M., Kobayashi, W., Redden, B., & Zrzavy, A. (2020). Environmental justice tools for the 21st century. *University of Michigan*.
- Bogger, T. L. (1976) The slave and free black community in Norfolk, 1775-1865. *University of Virginia*.
- Boggs, J. (2003). We the " White" People: Race, Culture, and the Virginia Constitution of 1902. *Virginia Polytechnic Institute and State University*.
- Brown, A. C. (1962). Norfolk: Historic Southern Port. *Duke University Press*.
- Bullard, R. D. (1993). Anatomy of environmental racism and the environmental justice movement. *Confronting environmental racism: Voices from the grassroots*, 15, 15-39.
- Bullard, R. D. (1994). Environmental justice for all: It's the right thing to do. *J. Envtl. L. & Litig.*, 9, 281.
- Bullard, R. D. (2004). Environment and morality. Confronting environmental racism in the United States. *United Nations Research Institute for Social Development*.

Champ, M. A. (2000). A review of organotin regulatory strategies, pending actions, related costs and benefits. *Science of the total Environment*, 258(1-2), 21-71.

Clark, S. S., & Miles, M. L. (2021). Assessing the Integration of Environmental Justice and Sustainability in Practice: A Review of the Literature. *Sustainability*, 13(20), 11238.

Commission for Racial Justice. (1987). Toxic wastes and race in the United States: A national report on the racial and socio-economic characteristics of communities with hazardous waste sites. *United Church of Christ*.

Cross, D. A., & Chappell, J. C. (2022). Highlighting assumptions of community engagement in urban stream restoration. *Freshwater Science*, 41(3), 532-538.

Cushing, L., Faust, J., August, L. M., Cendak, R., Wieland, W., & Alexeeff, G. (2015). Racial/ethnic disparities in cumulative environmental health impacts in California: evidence from a statewide environmental justice screening tool (CalEnviroScreen 1.1). *American journal of public health*, 105(11), 2341-2348.

CWH III. (1960). Federal Legislation to Safeguard Voting Rights: The Civil Rights Act of 1960. *Virginia Law Review*, 945-975.

Di Giulio, R. T., & Clark, B. W. (2015). The Elizabeth River story: a case study in evolutionary toxicology. *Journal of Toxicology and Environmental Health, Part B*, 18(6), 259-298.

Doyle, M. C. (2005). From desegregation to resegregation: Public schools in Norfolk, Virginia 1954-2002. *The Journal of African American History*, 90(1-2), 64-83.

Driver, A., Mehdizadeh, C., Bara-Garcia, S., Bodenreider, C., Lewis, J., & Wilson, S. (2019). Utilization of the Maryland environmental justice screening tool: A Bladensburg, Maryland case study. *International journal of environmental research and public health*, 16(3), 348.

Elizabeth River Steering Committee. (2020). State of the Elizabeth River scorecard. *The Elizabeth River Project*.

Elizabeth River Steering Committee. (2022). Elizabeth Watershed Action Plan V. *The Elizabeth River Project*.

Encyclopedia Virginia staff. Nansemond Tribe. (2020). In *Encyclopedia Virginia*. <https://encyclopediaofvirginia.org/entries/nansemond-tribe>.

Environmental Protection Agency. Superfund Site: Abex Corp. *EPA*.

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0302667#bkgground>

Environmental Protection Agency. Superfund Site: Atlantic Wood Industries, Inc. *EPA*.

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0302836#bkgground>

Environmental Protection Agency. Superfund Site: Norfolk Naval Shipyard. *EPA*.

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0302841#bkgground>

Environmental Protection Agency. Superfund Site: Norfolk Naval Base (Sewell's Point Naval Complex). *EPA*.

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0302858#bkgground>

Environmental Protection Agency. Superfund Site: Peck Iron & Metal. *EPA*.

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0306115#bkgground>

Environmental Protection Agency. Superfund Site: St. Julien's Creek Annex (U.S. Navy). *EPA*.

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0302852#bkgground>

Fausz, J. F. (1990). An "Abundance of Blood Shed on Both Sides": England's First Indian War, 1609-1614. *The Virginia Magazine of History and Biography*, 98(1), 3-56.

Feeley, S. D. (2000). Behind the united front: the effects of Anglo-Powhatan relations on settler conflict and consensus in Virginia, 1607-1675.

Fen, S. N. (1967). Notes on the Education of Negroes at Norfolk and Portsmouth, Virginia, during the Civil War. *Phylon (1960-)*, 28(2), 197-207.

Garcia, H., Murphy, L., Wendland, B., & Wu, T. (2021). Assessing Equity and Environmental Justice in the Great Lakes Restoration Initiative.

Garrison, J. D. (2021). Environmental justice in theory and practice: Measuring the equity outcomes of Los Angeles and New York's "Million Trees" campaigns. *Journal of Planning Education and Research*, 41(1), 6-17.

- Gilio-Whitaker, D. (2019). As long as grass grows: The Indigenous fight for environmental justice, from colonization to Standing Rock. *Beacon Press*.
- Godsil, R. D. (1991). Remediating environmental racism. *Michigan Law Review*, 90(2), 394-427.
- Gurtoo, A., & Antony, S. J. (2007). Environmental regulations: Indirect and unintended consequences on economy and business. *Management of Environmental Quality: An International Journal*.
- Hast, A. (1969). The Legal Status of the Negro in Virginia: 1705-1765. *The Journal of Negro History*, 54(3), 217-239.
- Hazard Jr, A. Q. (2020). Race and Constructions of “the Negro” in Colonial Virginia. *The African Experience in Colonial Virginia: Essays on the 1619 Arrival and the Legacy of Slavery*, 55.
- Hening, W. W. (1823). The Statutes at Large: Being a Collection of All the Laws of Virginia, from the First Session of the Legislature, in the Year 1619. Published Pursuant to an Act of the General Assembly of Virginia, Passed on the Fifth Day of February One Thousand Eight Hundred and Eight (Vol. 3).
- Higginson, T. W. (1861). Nat Turner's Insurrection.
- Hucles, M. (1992). Many voices, similar concerns: Traditional methods of African-American political activity in Norfolk, Virginia, 1865-1875. *The Virginia Magazine of History and Biography*, 543-566.
- Jelks, N. T. O., Jennings, V., & Rigolon, A. (2021). Green gentrification and health: A scoping review. *International journal of environmental research and public health*, 18(3), 907.
- Kramer, M. J. (2016). The 1622 Powhatan uprising and its impact on Anglo-Indian relations. *Illinois State University*.
- Kramar, D. E., Anderson, A., Hilfer, H., Branden, K., & Gutrich, J. J. (2018). A spatially informed analysis of environmental justice: analyzing the effects of gerrymandering and the proximity of minority populations to US superfund sites. *Environmental Justice*, 11(1), 29-39.
- Kuehn, R. R. (2000). A taxonomy of environmental justice. *Envtl. L. Rep. News & Analysis*, 30, 10681.

- Kuruppuarachchi, L. N., Kumar, A., & Franchetti, M. (2017). A comparison of major environmental justice screening and mapping tools. *Environ. Manag. Sustain. Dev*, 6, 59-71.
- Lesniak, M. (1966). Constitutional Law-The Poll Tax. *Harper v. Virginia State Board of Elections*, 86 S. Ct. 1079 (1966). *William & Mary Law Review*, 8(1), 161.
- Lind, P. (2022). An Analysis of Methodology: Quantifying the Effects of Redistricting and the Spatial Relationship of Minority Communities with Brownfields in Cook County, Illinois. *Northeastern Illinois University*.
- Littlejohn, J. L., & Ford, C. H. (2012). Elusive equality: desegregation and resegregation in Norfolk's public schools. *University of Virginia Press*.
- Martin, K. R. (2022). A Tale of Two Gentrifications: Reconceptualizing Gentrification Using Third Places, Demolition and Hierarchical Linear Modeling. *Old Dominion University*.
- Meier, A., & Rudwick, E. (1973). Negro Boycotts of Segregated Streetcars in Virginia, 1904-1907. *The Virginia Magazine of History and Biography*, 81(4), 479-487.
- Merchant, C. (2003). Shades of darkness: Race and environmental history. *Environmental History*, 8(3), 380-394.
- Moger, A. W. (1942). The Origin of the Democratic Machine in Virginia. *The Journal of Southern History*, 8(2), 183-209.
- Mohai, P., & Bryant, B. (1991). Race, poverty & the distribution of environmental hazards: Reviewing the evidence. *Race, Poverty & the Environment*, 3-27.
- Mooney, J. (1907). The Powhatan confederacy, past and present. *American Anthropologist*, 9(1), 129-152.
- Moore, J. H. (1982). The Norfolk Riot: 16 April 1866. *The Virginia Magazine of History and Biography*, 90(2), 155-164.
- Mullenbach, L. E., & Baker, B. L. (2020). Environmental justice, gentrification, and leisure: A systematic review and opportunities for the future. *Leisure Sciences*, 42(5-6), 430-447.
- Musselwhite, P., Mancall, P. C., & Horn, J. (2019). Virginia 1619: Slavery and Freedom in the Making of English America. *UNC Press Books*.
- Newby, C. L. (1992). "The world was all before them": A study of the black community in Norfolk, Virginia, 1861-1884. *The College of William and Mary*.

- Parramore, T. C., Stewart, P. C., & Bogger, T. L. (2000). Norfolk: The first four centuries. *University of Virginia Press*.
- Pearson, C. C. (1916). The readjuster movement in Virginia. *The American Historical Review*, 21(4), 734-749.
- Prossner, K. M., Vadas, G. G., Harvey, E., & Unger, M. A. (2022). A novel antibody-based biosensor method for the rapid measurement of PAH contamination in oysters. *Environmental Technology & Innovation*, 28, 102567.
- Rabin, Y. (1990). Expulsive zoning: The inequitable legacy of Euclid. *Zoning and the American Dream*.
- Reid, C. K. (2021). Crisis, Response, and Recovery: The Federal Government and the Black/White Homeownership Gap. *Oakland, CA: Turner Center for Housing Innovation UC Berkeley*.
- Richardson, V. (2019). Voting While Poor: Reviving the 24th Amendment and Eliminating the Modern-Day Poll Tax. *Geo. J. on Poverty L. & Pol'y*, 27, 451.
- Rigolon, A., Keith, S. J., Harris, B., Mullenbach, L. E., Larson, L. R., & Rushing, J. (2020). More than "Just Green Enough": Helping Park Professionals Achieve Equitable Greening and Limit Environmental Gentrification. *Journal of Park & Recreation Administration*, 38(3).
- Ringelstein, K. L. (2015). Residential segregation in Norfolk, Virginia: How the federal government reinforced racial division in a southern city, 1914–1959. *Old Dominion University*.
- Roberts, D. E. (2014). Loving v. Virginia as a civil rights decision. *NYL Sch. L. Rev.*, 59, 175.
- Routh, H. B., Bhowmik, K. R., Parish, J. L., & Parish, L. C. (1998). Historical aspects of tobacco use and smoking. *Clinics in dermatology*, 16(5), 539-544.
- Sadd, J. L., Pastor, M., Morello-Frosch, R., Scoggins, J., & Jesdale, B. (2011). Playing it safe: assessing cumulative impact and social vulnerability through an environmental justice screening method in the South Coast Air Basin, California. *International journal of environmental research and public health*, 8(5), 1441-1459.
- Schwarz, P. J. (1998). Twice condemned: Slaves and the criminal laws of Virginia, 1705-1865. *The Lawbook Exchange, Ltd.*

Shefveland, K. M. (2016). *Anglo-Native Virginia: Trade, Conversion, and Indian Slavery in the Old Dominion, 1646-1722* (Vol. 6). *University of Georgia Press*.

Stuart, K. A. (1984). "So Good a Work": The Brafferton School, 1691-1777. *College of William & Mary*.

Taylor, A. (2013). *The internal enemy: Slavery and war in Virginia, 1772-1832*. *WW Norton & Company*.

Taylor, D. E. (2000). The rise of the environmental justice paradigm: Injustice framing and the social construction of environmental discourses. *American behavioral scientist*, 43(4), 508-580.

Taylor, D. (2014). *Toxic communities: environmental racism, industrial pollution, and residential mobility*. *New York University Press*.

Wilkinson, A. B. (2019). People of Mixed Ancestry in the Seventeenth-Century Chesapeake: Freedom, Bondage, and the Rise of Hypodescent Ideology. *Journal of Social History*, 52(3), 593-618.

Yarsinske, A. W. (2007). *The Elizabeth River*. *The History Press*.

Zeise, L., Blumenfeld, J. (2021). *CalEnviroScreen 4.0*. *California Office of Environmental Health Hazard Assessment*.